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Development of a squadron premishap training program

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THESIS

DEVELOPMENT OF A SQUADRON PREMISHAP TRAINING PROGRAM

by

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March, 1994

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Development of a Squadron
Premishap Training Program

by

William J. Tatomer Jr.
B.S., Westminster College, 1985

Submitted in partial fulfillment of the
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I. INTRODUCTION

A. STATEMENT OF THE OBJECTIVE

The purpose of this thesis is to develop an aviation premishap training program which will support squadron designated Aircraft Mishap Board (AMB) Senior Members and squadron Aviation Safety Officers (ASO) in preparing, improving, and managing their current squadron premishap readiness posture. Squadron premishap training is an integral part of an aviation command's overall Aviation Safety Program. A squadron that encompasses organized, understandable, and relevant premishap training for its Aircraft Mishap Board, Squadron Duty Office, and squadron safety personnel possesses the "Safety Attitude" necessary to prevent and minimize squadron aviation hazards. Should an aircraft mishap occur, this same premishap training provides essential squadron personnel the educational information and techniques required to professionally manage and control this complex incident. In addition, prior premishap training improves the quality and efficiency of post-mishap investigation efforts and reporting requirements. The improvement in quality and efficiency realized from this prior training will increase the probability of determining the cause of an aircraft mishap.

Thus, supporting the purpose of the aircraft mishap investigation effort; to determine the cause(s) of a mishap and the damage and/or injury occurring in the course of the mishap, in-order to prevent mishap reoccurrence.

A course of instruction is developed by this thesis that enables the AMB Senior Member and/or the squadron Aviation Safety Officer to provide premishap training to selected members and segments of the squadron "Safety Team." This document should facilitate an improved understanding of premishap training information and also equip the ASO with a set methodology for transferring this learned knowledge into actual, hands-on implementation. This "transfer-of-training" will be supported by emphasizing and reiterating important premishap training procedures and techniques to the squadron ASO and presenting strategies in which to implement and teach these methods.

The "Squadron Premishap Training Program" developed in this thesis focuses on three distinct areas of premishap training. These areas are: 1) Aircraft Mishap Board training, 2) Squadron Duty Office Watch Team training, and 3) base-wide mishap simulation training. By providing AMB lecture lessons, media recommendations, planning and coordinating information, simulations material, specific aircraft mishap references, etc., within these three training areas, the AMB Senior Member and/or the squadron

Aviation Safety Officer will possess the information, encompassed in a single document, enabling them to prepare, conduct, and evaluate a thorough squadron premishap training program.

B. BACKGROUND

1. Aviation Safety Programs

Aviation Safety Programs, Department of the Naval Postgraduate School located in Monterey, California provides aviation safety training to prospective Aviation Safety Officers. The Aviation Safety Officer Training Course is a 28 day (five week) course which consists of approximately 146 classroom and laboratory hours, plus a two-day field trip. Subjects addressed in the classroom and laboratory during the course include aviation safety programs, mishap prevention techniques, operational aerodynamics and aerostructures, mishap investigation and reporting, aviation psychology, safety law and aeromedical support. [Ref. 1] This command also provides a 32 hour (one-week) safety training course to commanding officers, executive officers, officers in charge of aviation detachments, officers screened for command, and staff officers in the rank of Lieutenant Commander, USN, and Major, USMC, and above via the Aviation Safety Command Course [Ref. 1]. The Aviation Safety Command Course prepares graduates for the duties

required of an Aircraft Mishap Board Senior Member. As stated above, these two curricula provide extensive training in many different aviation safety related fields, preparing graduates to assist in and administer aggressive mishap prevention programs.

Although the Aviation Safety Officer and Aviation Command Course graduates possess a wealth of premishap knowledge, these individuals are not given all of the tools required to administer, instruct, and evaluate a thorough premishap training program. The program developed by this thesis begins where the Aviation Safety Programs curriculum concludes. The "Squadron Premishap Training Program" supplies the Aviation Safety Programs graduate with a training format specifically designed to transfer the premishap wisdom and procedures they learned in Monterey, into the operational "fleet" environment.

2. Naval Aviation Safety Program

As stated in [Ref. 2] the purpose of the Naval Aviation Safety Program is to preserve human and material resources. In preserving these resources the Naval Aviation Safety Program enhances operational readiness by safeguarding the critical human and material resources necessary to accomplish naval aviation missions. The Naval Aviation Safety Program accomplishes this by promulgating specific safety rules and procedures and then actively

training and educating Navy and Marine Corp Officers in accordance with these requirements [Ref. 2]. These methods aid immensely in preventing damage and injury to naval human and material resources. In preventing potential causes of damage and injury, termed hazards by Reference 2, the Naval Aviation Safety Program does in fact accomplish its primary objective.

Encompassed within the scope of the Naval Aviation Safety Program are all activities that might detect, contain, or eliminate hazards in naval aviation [Ref. 2]. These activities contain all possible phases, policies, and procedures relating to naval aviation. By including all facets of naval aviation into the Naval Aviation Safety Program, no responsible area or activity is left out of the program's range. This all-encompassing posture is a primary reason for the program's continued success.

The Naval Aviation Safety Program is based on the doctrine of "necessitarianism" [Ref. 2]. This doctrine states that "events are inevitably determined by preceding causes, and on a corollary of that doctrine: events may be prevented by elimination of their causes" [Ref. 2]. Because the primary purpose of the Naval Aviation Safety Program is preserving human and material resources, this doctrine implies that by eliminating a preceding casual factor to a

mishap, the actual mishap might be prevented there by preserving our vital resources.

3. Command Aviation Safety Programs

A command's aviation safety program is the micro-level version of the Naval Aviation Safety Program established for individual squadron use. An individual Squadron Aviation Safety Program consists of those written policies, procedures, and plans coupled with the attitudes and practices of the command that promote aviation safety within the command [Ref. 2]. Analogous to the Naval Aviation Safety Program, the purpose of the commands' Aviation Safety Program is to preserve the squadrons' human and material resources. Accomplishing this goal will ultimately enhance the overall operational readiness and morale of the squadron.

As explained by OPNAVINST 3750.6Q, the objectives of a Command Aviation Safety Program are very similar to those of the larger Naval Aviation Safety Program. These objectives, the elimination of safety hazards within the command and the improving of safety awareness in all squadron personnel, strengthen and support the objective of the Navy-wide program [Ref. 2]. The Command Aviation Safety Program is able to achieve these objectives by incorporating safety awareness training into the squadron training priorities, by detecting and eliminating hazards and

hazardous conditions, and by demanding high standards of conduct and performance from all Navy and civilian Department of Defense (DoD) personnel.

The Command Aviation Safety Program within the individual squadron is a collection of many different safety related programs and functions. These programs and functions are all established and managed by the squadron Commanding Officer via the respective Safety Department. The squadron Commanding Officer is responsible for establishing and maintaining a set of command safety goals and objectives, establishing and enforcing the command safety standards, and creating the optimal safety environment in which safety hazard detection and elimination are enhanced. [Ref. 2] The Commanding Officer is also responsible for promoting and governing safety education, safety training, and safety awareness programs within the squadron. Specific elements incorporated into the standard Command Aviation Safety Program and specifically directed by OPNAVINST 3750.6Q include:

1. Fostering a command climate that promotes the objectives of the program.
2. Establishing a clear set of aviation safety goals and policies that define individual responsibilities in attaining these goals.
3. Defining a command safety organization stating specific tasks, functions, and responsibilities of each member within the organization.

4. Establishing an Aviation Safety Council and an Enlisted Aviation Safety Committee to assist in managing and reviewing command safety policies.

5. Conducting periodical safety standdowns and safety surveys to enhance the squadrons' safety posture.

6. Conducting and documenting periodic safety training to include general safety training issues.

7. Enhancing and encouraging the exchange of safety information within the command and between other DoD activities.

8. Investigating and reporting all hazards as required by OPNAVINST 3750.6Q, OPNAVINST 4790.2, and other applicable directives. [Ref. 2:pp. 2-3].

The squadron Aircraft Mishap Board is another principal aspect of a Command's Aviation Safety Program. The squadron AMB is a standing board comprised of members appointed by the squadron Commanding Officer. The board is comprised of at least four officers: an Aviation Safety Officer, a flight surgeon, an officer well qualified in aircraft maintenance, and an officer well qualified in aircraft operations. [Ref. 2] In addition, one member of the board is designated as the Senior Member for the AMB. The Senior Member, a designated Naval Aviator or designated Naval Flight Officer, is responsible for the training and readiness of the AMB (Refer to OPNAVINST 3750.6Q, paragraph 206 for a complete listing of AMB requirements). The primary purpose of the AMB is to detect and eliminate future aviation hazards by investigating and reporting squadron

mishaps. The squadron AMB plays a major role in developing and maintaining a strong aviation premishap program.

C. PREMISHAP PLAN

Another integral part of the Command Aviation Safety Program is the squadron premishap plan. The squadron premishap plan is an emergency response instruction primarily used by Navy/Marine Corp commands for initiating reporting and investigative procedures used in the event of an aircraft mishap involving aircraft, equipment, or personnel assigned to that command. The premishap plan works as an emergency action checklist prompting and sequencing the Squadron Duty Office Watch Team or other controlling authority on what needs to be accomplished and when it should be done. All reasonable eventualities should be anticipated and measures taken, and incorporated, into the premishap plan to prepare and assist squadron personnel in managing and controlling a mishap situation [Ref. 2]. In accordance with OPNAVINST 3750.6Q, the squadron premishap instruction should contain many potential pre-and-post mishap items. An example of a few of these items are as follows:

1. Provisions for periodic drills of the premishap plan,
2. Staff pre/post mishap responsibilities, including flight surgeon/medical,

3. AMB task organization,

4. Responsibilities for transportation issues,

5. Description of arrangements for obtaining photo coverage of mishaps,

6. Description of coordination with local Public Affairs Office (PAO), Explosive Ordnance Disposal (EOD), and civil/military medical activities,

7. Procedures for use of local crash plan and for requesting emergency assistance,

8. Responsibilities of Commanding Officer, Executive Officer, Squadron Duty Officer, etc.,

9. Formats of required reports and investigative responsibilities of each AMB member [Ref. 2:pp. 2-6].

The squadron premishap plan is prepared and revised by the command's Aviation Safety Officer. The ASO receives specific premishap plan maintenance training while attending the Aviation Safety Officer Course in Monterey. Individual premishap instructions (plans) are expected to vary widely in content depending on the command's mission, resources, environment, and personnel. They should, however, include all information necessary to guide a squadron through the required reporting, investigating, coordinating, and managing functions that arise when an aircraft mishap occurs.

D. PROBLEM DEFINITION

As mentioned earlier, squadron premishap training is an integral part of a Command's Aviation Safety Program. Currently, squadron AMB Senior Members and Aviation Safety Officers are provided with the classroom knowledge and materials necessary to conduct an aggressive squadron mishap prevention program through training provided by Aviation Safety Programs, Naval Postgraduate School, Monterey. These graduates are also supplied with several tools to assist them in conducting squadron AMB training and premishap plan revision. However, no training vehicle currently exists in the Navy to fully assist these trained individuals in transferring this wealth of information, specifically mishap investigations, reporting, and management information to the "real world" operational environment.

E. SCOPE OF THE PROGRAM

In order to provide comprehensive and functional premishap training, all departments, units, and personnel directly involved in mishap management need to be involved. The purpose of the "Squadron Premishap Training Program" developed in this thesis is to provide this training by addressing three specific premishap training areas, stated earlier; 1) AMB training, 2) Duty Office Watch Team training, and 3) mishap simulation training. By

incorporating these three training areas into one comprehensive program, the squadron AMB Senior Member and/or squadron Aviation Safety Officer will possess the premishap knowledge, as well as the instructional means and methods, to fully implement and evaluate a functional squadron premishap training program.

II. LITERATURE REVIEW

A. OVERVIEW

The design and development of purposeful instructional material is a task that requires knowledge and skills extracted from many different segments of the education profession. Learning and applying the different theories and practices of this demanding discipline require an extensive review of relevant instructional design principles and design materials. The literature reviewed in this section contains all the information required to formulate, design, and develop a useable training curriculum specific to squadron premishap training.

The primary references reviewed for this thesis discuss the application of instructional design principles. However, team communication processes and emergency response planning information are also reviewed because of their applicability to specific segments of a squadron premishap training plan.

B. INSTRUCTIONAL DESIGN REVIEW

Instruction is a human undertaking provided to help people learn. While learning may happen without instruction, the effects of instruction on learning are often beneficial and easy to observe. When instruction is

designed to accomplish a particular goal of learning, it may or may not be successful. Thus, instruction must have certain characteristics in order to aid in the task of learning. In addition to containing these characteristics it is recognized that instruction must be planned with respect to daily lesson plans, course or topic instruction, and overall curriculum design, if it is to be effective [Ref. 3]. Realizing that instruction must be planned implies that instruction is designed and developed in some systematic way. This is the basic premise supporting the use of an instructional design methodology when developing instruction or an instructional curriculum.

In planning and designing instruction, certain characteristics need to be followed in order to maximize the effectiveness of the instructional process. Gagne and Briggs [Ref. 4] have developed a set of specific characteristics for instructional design. These characteristics include the assumptions and methods described subsequently.

First, Gagne and Briggs made the assumption that instructional design must be aimed at aiding the learning of the individual. This assumption is not concerned with large changes in the opinions, capabilities, or attitudes within societies but is oriented towards the individual.

Second, Gagne and Briggs stressed the importance of incorporating both immediate and long-range phases into instructional design. The immediate phase pertains to the instructor preparing lesson plans some hours before instruction. The long-range phase is concerned with the organization of lesson plans into topics, and a set of these topics constituting a course or curriculum.

A third assumption emphasizes that systematically designed instruction can greatly affect individual human development. According to Gagne and Briggs, undirected and unplanned learning is likely to lead to the development of many individuals who are in one way or another incompetent to derive personal satisfaction from living in our society of today and tomorrow.

The fourth idea states that instructional design should be conducted by means of a systems approach. The systems approach to instructional design involves the carrying out of a number of steps starting with an analysis of needs and goals, and ending with an evaluated system of instruction, which demonstrably succeeds in meeting accepted goals. [Ref. 4] The systems approach will be discussed in greater detail in a later portion of the literature review.

Finally, Gagne and Briggs believe that designed instruction must be based on knowledge of how human beings learn. According to Gagne [Ref. 4],

> In considering how an individual's abilities are to be developed, it is not enough to state what they should be; one must examine closely the question of how they can be acquired. Materials for instruction need to reflect not simply what their author knows, but also how the student is intended to learn such knowledge. Accordingly, instructional design must take fully into account learning conditions that need to be established in order for the desired effects to occur [p. 5].

As referenced by Gagne, learning conditions are an important aspect of instructional design. Learning conditions or learning principles have been researched and investigated by psychologists for many years. These learning principles, which include contiguity, repetition, and reinforcement are all good, solid principles but including these learning principles in instruction does not guarantee an efficient learning situation [Ref. 5]. Gagne believes that the missing learning conditions are to be sought within the individual, rather than the external environment. These conditions are the states of mind that the student brings to the learning situation, usually in the form of previously learned capabilities or preferences. Because these capabilities are considered a highly important set of factors in insuring effective learning, the instructional designer and course instructor should research student requisite knowledge requirements and capabilities prior to commencing instructional planning [Ref. 5].

C. SYSTEMATIC DESIGN

In order to design instruction systematically, a rationale for what specific subject, topic, or issue to be learned must first be established [Ref. 6]. This requires the instructional designer to revisit the recognized reason or need that brought about the demand for the instruction. A system of instruction may then be constructed starting with a base of information that reflects these identified goals.

Gagne and Briggs maintain that the design of instruction is separated into four distinct levels. These levels, which include the system level, the course level, the lesson level, and the evaluation level include stages which further define the design methodology. These various levels and stages are listed in Table 2.1.

Even though these stages are listed as discrete steps shown in a sequential, linear fashion, emphasis is placed on the iterative nature of the design process [Ref. 4]. This is to say that in actual design there is alot of working backwards and forward in a non-linear, non-sequential fashion. This occurs because work done at any one stage gives new insights into the other stages. This results in alot of "working back and forth" through the different stages as the total instructional design process develops [Ref. 4].

TABLE 2.1 STAGES IN DESIGNING INSTRUCTIONAL SYSTEMS

SYSTEM LEVEL

1. Analysis of Needs, Goals, and Priorities
2. Analysis of Resources, Constraints, and Alternate Delivery Systems
3. Determination of Scope and Sequence of Curriculum and Courses; Delivery System Design

COURSE LEVEL

4. Determining Course Structure and Sequence
5. Analysis of Course Objectives

LESSON LEVEL

6. Definition of Performance Objectives
7. Preparing Lesson Plans
8. Developing, Selecting Materials, Media
9. Assessing Student Performance (Performance Measures)

EVALUATION SYSTEM LEVEL

10. Teacher Preparation
11. Formative Evaluation
12. Field Testing, Revision
13. Summative Evaluation
14. Installation and Diffusion

Source: "Principles of Instructional Design", p. 23.

Note: This model consists of four discrete levels with fourteen associated stages.

The first three design stages focus upon the determination of needs and goals sought as the outcomes from an entire course of instruction. These needs and goals are reviewed in terms of resources available and the possible delivery systems that could be employed for the intended instruction. This preliminary work broadly views the entire scope of outcomes desired. The goals at this point are thus broadly stated, and often arranged in the form of a curriculum scope and sequence statement, showing the desired outcomes for each course. These three stages are labelled as work done at the "system (or curriculum) level." [Ref. 4]

The next two stages of work consist of considering separately each course to be planned. The two principal products are the determination of the overall structure of each course in terms of major units of instruction and a listing of the objectives to be achieved by the end of the course. These analyses are thus described as "course level" analyses. [Ref. 4]

The next four stages or steps of work are described as working at the "lesson level." This consists of defining detailed performance objectives, preparing lesson plans, developing course materials and selecting media, and preparing measures for assessing student performance.

D. PERFORMANCE OBJECTIVES

Defining and preparing detailed performance or instructional objectives are an important part of the instructional design process [Ref. 7]. Robert Mager gives three specific reasons explaining the significance of performance objectives.

> First, when clearly defined objectives are lacking, there is no sound basis for the selection or designing of instructional materials, content, or methods. If you don't know where you're going, it is difficult to select a suitable means for getting there. After all, machinists and surgeons don't select tools until they know what operation they are going to perform.
>
> A second important reason for stating objectives sharply has to do with finding out whether the objective has, in fact, been accomplished. Tests or examinations are the mileposts along the road of learning and are supposed to tell instructors and students alike, whether they have been successful in achieving the course objectives. But, unless objectives are clearly and firmly fixed in the minds of both parties, tests are at best misleading; at worst, they are irrelevant, unfair, or uninformative. Test items designed to measure whether important instructional outcomes have been accomplished can be selected or created intelligently only when those instructional outcomes have been made explicit.
>
> A third advantage of clearly defined objectives is that they provide students with the means to organize their own efforts toward accomplishment of those objectives. Experience has shown that, with clear objectives in view, students at all levels are better able to decide what activities on their part will help them get to where it is important for them to go. [Ref 8:pp. 5-7]

Objectives then, are useful in providing a sound basis for the designing of instructional content and procedures, for evaluating or assessing the success of the instruction, and for organizing the students' own efforts and activities

for the accomplishment of the important instructional intents. Mager defines an instructional objective as a statement describing an instructional outcome, rather than an instructional process or procedure. An example of an acceptable learning objective is as follows:

> In at least two computer languages, be able to write and test a program to calculate arithmetic means [Ref 8:p. 11].

This example clearly describes an outcome of the instruction, something the student is expected to do. An instructional process or procedure would not describe an outcome but would state how the student could develop the computing skill shown in the example.

E. LESSON PLAN DEVELOPMENT

Preparing lesson plans is another important step accomplished by the instructional designer at the "lesson level." In designing a lesson one needs to insure that the general events of instruction are provided for. These general instructional events, taken from Principles of Instructional Design, by Gagne and Briggs, are listed in Table 2.2. These learning principles are processes that make instruction possible. The order of these events for a lesson or lesson segment is only approximate, and may vary somewhat depending on the lesson objective. Not all elements are invariably used. [Ref. 4:p. 170]

It is also necessary to classify the lesson as having a particular type of learning objective. Gagne and Briggs [Ref. 9] explain that once lesson classification has been accomplished then it is possible to place the lesson in a sequence relating to its prerequisite. For example, lesson objectives that specify the learning of fairly complex skills would require the prior learning of simpler skills in order for the instruction to be effective [Ref. 9:p. 85]. This type of sequencing is necessary if effective learning is to occur. In addition to sequencing, it is important to incorporate into the instructional events of the lesson, listed in Table 2.2, the conditions for effective learning appropriate to the area being taught. These events are brought about by whatever media are selected as most appropriate for the purpose. Gagne and Briggs further recommend that designing lesson plans include the following four phases [Ref. 4:p. 34]:

1. List the instructional events to be brought into play to accomplish the objective of the lesson.
2. Determine the materials, media, or agents to be employed for making each event possible.
3. Design or plan learning activities, including plans for how media and materials are to be used.
4. Preview the selected media and materials to plan the roles or events which the teacher needs to accomplish for the lesson.

These steps are emphasized by Gagne and Briggs to incorporate the appropriate sets of conditions of learning into a plan for bringing about each instructional event, in order that the learners achieve the objective of the lesson [Ref. 4].

TABLE 2.2 EVENTS OF INSTRUCTION, AND THEIR RELATIONS TO PROCESSES OF LEARNING

INSTRUCTIONAL EVENT	RELATION TO LEARNING PROCESS
1. Gaining Information	Reception of patterns of neural impulses
2. Informing the Learner of the Objective	Activating a process of executive control
3. Stimulating Recall of Prerequisite Learnings	Retrieval to working memory
4. Presenting the Stimulus Material	Emphasizing features for selective perception
5. Providing "Learning Guidance"	Semantic encoding
6. Eliciting the Performance	Activating a response organization
7. Providing Feedback About Performance Correctness	Establishing reinforcement
8. Assessing the Performance	Activating retrieval; making reinforcement possible
9. Enhancing Retention and Transfer	Providing cues and strategies for retrieval

Source: "Principles of Instructional Design," p. 157.

F. MEDIA SELECTION

In developing instructional design theories and methodologies, there has been considerable research and development in the important subject of media aids and the usage of media selection aids. A study conducted by the Navy Personnel Research and Development Center (NPRDC) in

San Diego, California, in 1988, reviewed 23 of the most current and viable military training decision aids [Ref. 10]. The study used a list of "Training Situation/Level Criteria" to evaluate each training aid. These critique factors provide a useful set of considerations in training program development. The NPRDC report states that to be optimally effective, such aids must be appropriately designed and oriented to the needs of specific users. The study also noted that decision aids that are to be used by military personnel who may not be highly experienced in instructional systems development should provide strong user guidance. Many of the current training aids decision methods rely on a strong foundation of knowledge in the area of instructional development even though relying to heavily on instructional development practices could possibly hinder development of a practical, usable program. This is why it is important to design and utilize those media systems most beneficial and directly oriented to the needs of the specific user.

As an expert in the field of media selection and usage, Robert Gagne [Ref. 11] discusses media selection factors and discusses them in two distinctly separate categories: 1) physical attributes of media, and 2) learner, setting, and task characteristics. In his review of ten media selection models, Gagne uses these two groupings to discuss the

strengths and weaknesses of the different models. Gagne seems to stress three primary points: 1) one must identify the audience and environment: 2) there is no one medium that will address all factors; and 3) both categories of factors need to be considered in media selection.

G. ASSESSING STUDENT PERFORMANCE

As reported by Briggs [Ref. 12], preparing measures for assessing student performance is an essential part of the instructional design process. Briggs [Ref. 12:p. 46] states that evaluative tests should be prepared for two general reasons: 1) for use in tryouts and revisions of first-draft materials, to evaluate materials; and 2) for normal classroom use, to evaluate student performance. That is, the performance of tryout learners is used as a guide to evaluate and improve the materials; and when course revisions are completed, and the course is in normal operation, regular student performances are evaluated to see if the objectives of the instruction have been met. Briggs further explains that since tests are needed for both of the above purposes, the course development phase could include preparation of tests for all of the following levels of objectives in the course: 1) end-of-course objectives; 2) end-of-unit objectives; 3) specific behavioral objectives; and 4) subordinate competencies of specific objectives.

The specific rationality for using these levels is explained by Briggs [Ref. 12] as follows,

> Tests at all four levels of objectives are also useful for evaluation of performance of the student population after the course is in normal operation. Tests over competencies of an objective are useful for remedial purposes, to find the source of trouble when a student fails a test over a specific behavioral objective. Tests at the level of specific objectives can assure the teacher that the student is ready to go on to the next objective. Tests over units can reveal the learner's mastery over more complex objectives. End-of-course tests can measure the student's ability to use all his prior learning to solve still more complex problems or to apply his knowledge to a wider range of situations [p. 47].

H. MILITARY INSTRUCTIONAL SYSTEMS DEVELOPMENT

Instructional Systems Development (ISD) is a systematic means for defining training goals, deciding upon the best means of achieving goals within resource constraints, and providing evaluation of the program [Ref. 13]. The emphasis here is placed on instruction based on clearly defined needs. Training developed by ISD takes less time to administer because irrelevant information is eliminated in the ISD process. Large cost savings have been demonstrated in both the military and private industry from using the Instructional Systems Development Approach.

The first formal ISD procedures appeared in the 1950's in the military, particularly in the United States Air Force. The systems approach was adapted from those methods used by Operations Research and Systems Engineering

professionals in the development of military weapon systems. These systems-analysis methods had developed during World War II to help resolve problems in managing the design, production, and evaluation of new weapon systems. This process was accomplished then and is accomplished today, by breaking tasks down into simplified descriptions of subparts to reduce the overall complexity of the process and create learnable curriculum components. [Ref. 13]

By the end of the 1960's, the use of ISD methods had become common in all branches of the military service. In addition, ISD methods started to appear in both civilian industrial and commercial training applications.

In 1981, the U.S. Office of Naval Education and Training in Pensacola, Florida, published NAVEDTRA 110A Procedures for Instructional Systems Development. As the title suggests, this instruction provides specific guidance for the analysis, design, development, implementation, and control of instructional programs under the cognizance of the Chief of Naval Education and Training [Ref. 14]. This manual utilizes principles and concepts very similar to those discussed earlier and employed by Gagne and Briggs. However, this manual packages these principles and concepts in a very standardized and easy-to-reference format. NAVEDTRA 110A allows the novice instructional designer the majority of material required to comprehensively analyze,

design and develop military instructional materials and courses. The ISD model consists of five major phases, listed in Table 2.3 [Ref. 15].

TABLE 2.3 OVERVIEW OF THE ISD PROCESS

1. Analysis: in this phase the developer gathers and analyzes information to determine:
   a. whether training is the appropriate organizational response to a problem, issue, or need. If so, what kinds of training will be needed;
   b. what goals and objectives the training should accomplish;
   c. profiles of the people needing training;
   d. what resources are available; and
   e. other information needed to develop a useful training program.

2. Design: this phase prepares the developer for selecting and writing program materials. During this phase the developer will:
   a. write lesson/program objectives;
   b. develop test items;
   c. determine design structure and sequence;
   d. decide what documentation will be needed for the training program; and
   e. plan program evaluation.

3. Development: in this phase, a developer prepares materials for:
   a. training participants use;
   b. instructor use;
   c. training documentation;
   d. training participants evaluation; and
   e. program evaluation.

4. Implementation: in this phase the program is actually carried out. Typically, this means that classes are held, self-paced courses are begun, or on-the-job training (OJT) starts.

5. Evaluation/Control: this phases involves internal and external evaluation of the training program itself. Evaluation of training participants is usually considered an aspect of implementation. This phase may be carried out by the developer or by a specialist.

Source: "INFO-LINE, American Society for Training and Development", [Ref. 15:p. 3].

I. COURSE RESEARCH & MATERIALS REVIEW

In addition to the instructional modeling and process analysis and review mentioned above, extensive course research and specific mishap materials review was undertaken. These steps were accomplished for two reasons; 1) to determine if other Navy premishap training programs existed and 2) to re-educate and inform the author on the current premishap information, materials, and procedures present in the training and operational environments.

Research to ascertain the existence of a comparable squadron premishap training program was conducted through cooperation with Aviation Safety Programs in Monterey, California. A thorough review of current Navy instructions and dialogue with the Naval Safety Center indicated that no other squadron premishap training program of this content was in existence.

Current Aviation Safety Programs Aviation Safety Officer and Safety Command Course premishap and investigations lectures were monitored by the author in order to analyze and relearn relevant premishap information and procedures. The author also conducted an extensive review of OPNAV, COMNAVAIR, Air Force, and Army instructions and publications to acquire specific premishap related knowledge.

J. GROUP/TEAM COMMUNICATION REVIEW

The reason Naval Commands conduct aircraft mishap investigations is to accurately determine the causes of the accident and make recommendations that, once implemented, will prevent hazard recurrence [Ref. 2]. The chances of finding these causes are greatly reduced if the AMB is not able to communicate during mishap training, during on-scene coordination of an actual mishap investigation, and while deliberating during the mishap investigation report (MIR) write-up. These elements emphasize why communication between AMB team members is a pivotal segment of mishap training and investigation procedures.

Communication is the flow of information, ideas, concepts, techniques, etc., in written, verbal, or non-verbal form from a sender to a specific receiver. Communication barriers which decrease the effectiveness of this information flow pose a threat to Aircraft Mishap Board efficiency. As listed by Massie [Ref. 16] some of the more common communication barriers which jeopardize team productiveness along with proposed communication remedies are as follows:

> Distortion may be a matter of noise in transmission or it may result from inadequacy of the words in carrying the precise ideas of the sender. An important means of overcoming the distortion barrier is to expand the horizons of each member so that each can understand the meaning in the minds of other members. Another means is to use what the psychologist calls empathy--attempt to

project oneself into the viewpoint of the other person. A major step in handling distortion is the development of an awareness that some degree of distortion always exists.

Filtering is a barrier to communication that takes the form of intentionally sifting the information so that the receiver will look favorably on the message. No one likes to admit mistakes to some one else, especially the boss. The remedies for filtering are a well-designed control system, the development of rapport within the organization /group, reducing the fear of failure, and increasing the awareness of superiors to the problems of subordinates.

Overloading of communication channels can cause the network to be jammed with irrelevant messages or information. The answer to this problem lies in monitoring the channels to clear messages in order of priority and importance. The communication system should provide for editing devices, or persons, to regulate the quality and quantity of communications with regard to sufficiency of information for decision centers. [Ref. 16:pp. 116-117]

K. EMERGENCY RESPONSE PLANNING REVIEW

Reviewing disaster preparedness and airport emergency plan literature, specifically those studies discussing and examining testing airport emergency plans, was vital in developing the "Squadron Premishap Training Program." This literature contains a wealth of professional knowledge and material obtained from prior research and development conducted in this area. The training program developed by this thesis contains two areas, the Duty Office Watch Team training segment and the base-wide simulation training segment, which involve many of the concepts, principles, and methods applied in developing and implementing these prior

programs. A review of the literature revealed the following relevant disaster preparedness/airport emergency plan issues: 1) testing and training the plan, 2) types of airport emergency simulations, and 3) maintaining the plan.

1. Testing & Training the Plan

Testing an emergency plan is mandatory for verification that it is practical and that it uses the airstation, the squadron, and the surrounding community resources effectively. Testing, however, can only occur after proper emergency plan training has occurred. As stated by COMNAVBASE San Diego OPLAN 6-92, [Ref. 17],

> The primary objective of an effective training program is the achievement of the highest possible level of readiness to be able to respond rapidly and efficiently to civil disasters and as a result minimize loss of operational and mission readiness and ensure maximum survivability of personnel. It is recognized that achieving the optimum level of readiness may be constrained by limited resources. However, those charged with emergency management responsibilities must exercise initiative, creativity and maximum use of all available resources to attain the highest level of readiness possible [p. N-1].

Once thorough premishap/emergency response training has occurred, evaluation of this training program and the overall premishap response plan can occur.

By conducting proper premishap/emergency response simulations, the actual pre-trained emergency management responsibilities and the overall effectiveness of the premishap plan can be evaluated. In addition, testing the

plan will facilitate several important functions; 1) it will give participants the opportunity to practice their specific roles under various conditions, 2) it will enable participants to meet each other and become familiar with the airstation facilities, and 3) testing the plan will allow the squadron and the airstation to revise the procedures as appropriate so that the plan remains effective and current. [Ref. 18]

2. Types of Simulations

According to the Federal Aviation Administration [Ref. 19], Transport Canada [Ref. 18], and Jane's Airport Review [Ref. 20], there are three types of emergency preparedness drills commonly used at airports today: 1) a full scale mock incident, 2) table top "functional" simulations, and 3) partial testing using a combination and/or parts of the first two types.

a. Full Scale Test

This simulation involves the full response of the airport and the surrounding community to a simulated airport emergency. Planning for a major exercise of this scope can take up to six months and in the U.S. can involve up to 200 "victims," acting the part of severe casualties [Ref. 20]. Although costly, lessons learned by these simulations, specifically communications and coordination information, have proved invaluable.

b. Table Top Exercises

These emergency response drills are carried out in a classroom situation with all participants responding verbally to an emergency scenario. This format allows participants to describe their responses and the actions they would take. These types of simulations, although not as encompassing and thorough as the full scale simulations, provide valuable premishap training. For example, as stated by Transport Canada [Ref. 18],

> This type of exercise would immediately confirm if contact telephone numbers were current and that response times were practical. The descriptions of the procedures by individuals would identify gaps, iron out difficulties with terminology, and identify shortages of equipment [p. C20].

c. Partial Testing Exercise

Partial simulations involve taking one or more elements of the entire emergency response/premishap team and focus the evaluation on only these areas. For example, evaluating the medical response team and the crash/fire team by having these two elements respond to a simulated exercise provided exclusively for them. These types of simulations are valuable because they allow the realism of the full scale simulation but are considerably less disruptive t- airport operations and are less costly to conduct. An

example of this testing format providing valuable training information for a foreign airport was cited in Jane's Airport Review [Ref. 20],

> A recent training exercise at London/Gatewick highlighted communications problems within the local ambulance services, according to the airport's Chief of Airside Safety and Operations, John Bourne. As a result, the police force---responsible for managing airport incidents in the UK---could not keep track of which casualties were sent to which hospitals [p. 36].

3. Maintaining the Plan

Although testing the plan will reveal the effectiveness of the plan, gaps and inconsistencies in the plan, and an overall concept of the plan's usefulness, it is essential that the actual emergency response planning document be reviewed regularly to ensure readiness and currency. This periodic reassessment should include, at a minimum, examining; 1) telephone numbers, 2) communications frequencies, 3) lists of emergency equipment and supplies, 4) changes in normal airport operations, and 5) updating or renewal of mutual aid agreements. [Ref. 18,19]

L. SUMMARY

This chapter identified and discussed many of the salient theories, practices, and skills required to design and develop a useable instructional training program. As this chapter revealed, the instructional development process requires not only a solid understanding of instructional

design theories and models but also requires a strong understanding of actual instructional "learning" conditions and principles. In addition, specific aspects of the communication process, pertinent to the training program developed in this thesis, were addressed. This chapter also included a detailed examination and review of relevant emergency response planning and training materials and specific military premishap information sources.

The analysis and review of all previously mentioned information and material was requisite to accomplishing the analysis, design, and development of the "Squadron Premishap Training Program" produced in this thesis.

III. METHODOLOGY

This section of the thesis introduces the research methods utilized by the author to design and develop the "Squadron Premishap Training Program." These methods will supply the "recipe" required to design and develop a training program of this scope.

A. NEEDS ANALYSIS

The first step in the instructional design process is determining whether an actual requirement for the instruction exists. This was accomplished by conducting an informal needs/job analysis of required billet tasks and elements specific to Aviation Safety Officers and AMB Senior Members. Interviews with experienced Aviation Safety Officers and former AMB Senior Members were conducted. Detailed information concerning existing job requirements and standards, current safety programs training methods, and desired job/training improvements were discussed. Specifically, Aircraft Mishap Board, Squadron Duty Office watch team, and specific premishap training issues were addressed [Ref. 21]. These respondents clearly indicated a strong desire for an easy-to-implement and functional premishap training program.

On the basis of the needs analysis, it was determined that a course of instruction was required to teach key squadron safety personnel basic principles involved with aircraft mishap investigation, reporting, and management. While Aviation Safety Officers and Aircraft Mishap Board Senior Members do receive some instruction in the process of mishap investigation and related procedures, the needs analysis determined no training was available that provided "hands-on" experience in actually conducting mishap investigations, preparing mishap investigation reports, and managing an investigation effort in a realistic operational setting.

Once the needs analysis was performed, and an actual demand for the instruction identified, the focus of the instructional process focused on the following three areas. These areas; 1) reviewing and analyzing instructional design and development literature, which built a strong and credible informational foundation, 2) selecting and using a proven training model to implement the acquired instructional skills and knowledge, and finally, 3) the task of actually designing and developing the instructional program.

In order to give the reader a better understanding of the three phases introduced above, the next three segments

of this section will focus on the individual processes of literature analysis, instructional modeling, and course design and development procedures.

B. LITERATURE ANALYSIS

Thoroughly reviewing and analyzing instructional design and development literature provided the necessary information to formulate the "Squadron Premishap Training Program." The literature review, which is provided in section two of this thesis, gives an extensive summary of the instructional design and development theories and practices analyzed prior to the inception of the program. By analyzing instructional considerations in the larger macro-view, i.e., instructional theories and models, and examining the micro-level aspects of instructional design and development, i.e., designing performance objectives and formulating lesson plans, all facets of curriculum design and development were encompassed. Reviewing and applying these procedures provided the foundation for instructional design. After all, proper instructional systems development truly depends on following those theories and practices extensively accepted and used by the education profession.

C. INSTRUCTIONAL MODEL

Designing and developing a purposeful and functional training program requires the use of a credible and proven training model. Several different models were researched and analyzed in attempting to select the most appropriate model for the instructional need. The model ultimately selected in developing the "Squadron Premishap Training Program" incorporated information and processes from two different sources--the Chief of Naval Education and Training and the ISD principles of Robert Gagne and Leslie Briggs. The Chief of Naval Education and Training (CNET) publication, NAVEDTRA 110A, Procedures for Instructional Systems Development, provided the framework for the overall modeling process. Incorporated into this framework were many of the key features of instructional design and ISD theories and practices advocated by Robert Gagne, Leslie Briggs, and other notable ISD specialists. The merger of these two sources of information provided the complete "model" used in developing this instruction.

As referenced in the literature review, the Instructional Systems Development Approach provides specific guidance for the analysis, design, development, implementation, and control of instructional programs. The Instructional Systems Development Approach (ISD) was the principal instructional model used in developing the

"Squadron Premishap Training Program," because it provided both a proven instructional design model and because it is the model recommended by the Chief of Naval Education and Training for designing instructional programs. (CNET requires the use of this publication for all curricula developed within or for use within the Naval Education Training Command.)

The methodology used in researching, designing, and developing the "Squadron Premishap Training Program" relied heavily on the first three phases of the ISD model. These phases; analysis, design, and development were incorporated and utilized in program formulation. The fourth phase, implementation, was initiated following program development. Preliminary implementation of the program was conducted in March of 1994. Initially, five different Navy and Marine Corps aviation squadrons were given the program to implement into their Command Safety Training Programs. Extensive evaluation and subsequent revision of the program will need to be conducted in a follow-on thesis or occur at the individual squadron level.

D. PROGRAM DESIGN AND DEVELOPMENT

As mentioned earlier, the methodology used in the design and development of this thesis incorporated the interservice Instructional Systems Development model with the theoretical

and applied methods of several notable ISD specialists. The consolidation of these materials provided a qualified modeling framework with the expert knowledge necessary to support program design. The design and development of the "Squadron Premishap Training Program" was accomplished by using this modeling framework and applying it to three different instructional segments; an AMB segment, a duty office watch team segment, and a base-wide simulations segment. These segments were chosen based on the information derived from the needs analysis and the in-depth review of relevant premishap information and materials. Learning objectives, lesson plans, and instructional materials and references were prepared for each instructional segment. (The instructional segments were developed in the following order; 1) AMB training segment, 2) duty office watch team segment, and finally 3) the base-wide simulations segment.) Specifically, the design and development process was accomplished using the following three level instructional approach.

1. Systems Level

The needs analysis provided the demand and the focus for the program. Prior experience in the aviation safety field, in addition to the ASO interviews and Safety School lecture material, defined the scope of the proposed program. Since premishap training primarily involves three segments

of the squadron, the squadron Aircraft Mishap Board, the squadron Duty Office, and the squadron Safety Department, individual training courses were designed specifically for these three groups. These individual segments utilized different instructional practices to achieve a common desired outcome--effective squadron premishap training.

Program and course sequencing was determined by established principles discussed in the literature review. For example, the AMB training lessons provide the knowledge and understanding of requisite premishap information. These training lessons were designed to occur prior to the training program's mishap drill segment which provides a method to evaluate this previously learned knowledge. This understandable sequence provided continuity and coherence to the structure of the training program. Similar thought and sequencing rationale was used during all stages of the training programs design.

2. Lesson Level

The design of the three individual training areas followed the guidance and methods established in the literature review.

Performance objectives were defined and prepared providing a focus for designing instructional content and procedures, for evaluating the success of the instruction, and for organizing the learner's own efforts and activities

for the accomplishment of important instructional intents. The advantages to creating performance objectives to these specifications are listed in Section D of the literature review.

Lessons were prepared insuring that the general instructional events, listed in Table 2.2 of the literature review, were provided for. These instructional events incorporate the appropriate sets of conditions of learning into a plan for bringing about each instructional event. These research-based events unquestionably assist the learners in achieving the objective of the lesson [Ref. 4]. This is an important factor in ensuring overall lesson plan effectiveness.

Selecting media appropriate for the three different segments of the "Squadron Premishap Training Program" was accomplished by making specific media recommendations for each training area. Media selection involves choosing the best possible media method in order to stimulate the trainee's learning abilities while supporting achievement of the course training objectives. Media recommendations were provided to allow the premishap training instructor the greatest amount of media selection flexibility. Squadron operational and training environments often dictate specific media availability, thus recommendations that could be used, modified, or discarded by the instructor were furnished.

3. Assessment/Validation Level

After the lesson level events were accomplished, the assessment or validation methods of the training program were specified. The primary validation method used in the "Squadron Premishap Training Program" was incorporated into the "Base-wide Simulations" section of the program. This section of the program used the requirements specified in OPNAVINST 3750.6Q and other relevant OPNAV instructions, in addition to the performance and knowledge based instructional objectives specified in the individual training program lessons, as criteria. Performance skills and/or knowledge adeptness were evaluated according to these established "premishap" criteria.

The assessments used in the "Base-wide Simulations" section were designed to measure the effectiveness of the individual training areas and instructional efforts in terms of satisfying these stated performance and knowledge based criteria. These objective-referenced assessments were selected because they provided the best format to evaluate the premishap training programs overall effectiveness. These assessments were developed using specific guidance established in NAVEDTRA 110A. NAVEDTRA 110A recommends formulating these criterion-based evaluations by completing two separate steps; 1) conducting an internal review of lesson material and 2) using the individual trial method in

preparing lessons tests [Ref. 14:p. 3-175]. Utilizing these processes as a model provided a solid format to develop reliable and valid premishap assessment procedures.

In addition to the segment assessments mentioned above, an end-of-course evaluation form was developed (attached as Appendix B-3). This evaluation form was designed to provide direct feedback from the programs 'trainees' to the squadron Safety Department. Obtaining this feedback will provide the squadron Safety Departments with valuable information to use in amending and/or modifying existing training program segments.

IV. SUMMARY AND RECOMMENDATIONS

As mentioned in the introduction, the purpose of this thesis is to develop an aviation premishap training program that supports squadron designated Aircraft Mishap Board Senior Members, Aviation Safety Officers, and Squadron Safety Departments in preparing, improving, and managing their current squadron premishap readiness posture. The "Squadron Premishap Training Program," provided in Appendix A, is a ready-to-use, established squadron premishap training resource that will benefit an aviation squadron in two ways. First, this training program provides a valuable safety training resource to the squadron that emphasizes and highlights aviation premishap training instruction, materials, concepts, and practices. The training program is designed specifically for use by aviation safety departments and/or commands. Secondly, this resource is presented in a format that requires minimal squadron effort (manpower hours, resources allocation, etc.) to implement. Because the Aviation Safety Officer, AMB Senior Member, and squadron Safety Officer are all constrained by a multitude of additional squadron/billet requirements, the "easy-to-implement" feature of the program gives it added worth. Additionally, incorporating the "Squadron Premishap Training

Program" into the existing squadron safety training agenda will further assist the Aviation Safety Officer, the Squadron Safety Department, and the entire command in realizing the purpose of the Chief of Naval Operation's (CNO), Naval Aviation Safety Program; preserving the human and material resources used in accomplishing naval aviation missions [Ref. 2].

A. SUMMARY OF INSTRUCTION DEVELOPED

The scope of the "Squadron Premishap Training Program" developed in this thesis primarily entails the analysis, design, and development of a training curriculum devoted to supporting the individual squadron's safety effort. Because safety information related to squadron premishap training is contained in many different publications and provided by various agencies and branches of the military service, one of the primary goals of this thesis was to develop a training document that combined these references and materials into a single, yet functional, instructional format. In addition, the instructional format of this training program was specifically tailored for use by Naval Aviation Commands.

The instructional sequence of premishap information and material provided in this program will assist a Squadron Aviation Safety Officer, AMB Senior Member, or other

designated individual in effectively educating, training, and evaluating the primary squadron mishap participants involved in investigating, reporting, coordinating, and managing an actual mishap situation.

Specifically, detailed training segments were designed and developed for the Squadron Aircraft Mishap Board and the Squadron Duty Office. In addition to these two training syllabuses, a broad-based training segment was formulated to assist the Squadron Safety Department in planning, organizing, administering, and evaluating base-wide mishap simulations. The integration of these three separate training segments resulted in the "Squadron Premishap Training Program," which as mentioned earlier, is provided in Appendix A of this thesis. A detailed analysis and summary of the three training segments; the AMB training segment, the squadron duty office training segment, and the base-wide premishap simulations training segment is provided subsequently.

B. AIRCRAFT MISHAP BOARD TRAINING

1. AMB Background

The squadron Aircraft Mishap Board is a standing squadron board whose primary responsibility is investigating and reporting Naval Aviation mishaps. This board consists of, at a minimum, four officers: an Aviation Safety Officer,

a flight surgeon, an officer well qualified in aircraft maintenance, and an officer well qualified in aircraft operations. One member of the AMB is designated as the AMB Senior Member. This individual is required to meet the following conditions: 1) be a designated naval aviator or naval flight officer, 2) in the event of a class A mishap be appointed by the aircraft controlling authority and not be under the cognizance or direct chain-of-command of any reporting custodian in the mishap, and 3) be senior in rank to the pilot in command or the mission commander involved in the mishap. This designated member is also responsible for training and the readiness of the Aircraft Mishap Board within their respective squadron [Ref. 2].

2. Instructional Format

The Aircraft Mishap Board training segment is comprised of four different instructional lessons. These lessons follow the lesson model provided in NAVEDTRA 110A, Procedures for Instructional Systems Development and incorporate the instructional principles developed by Robert Gagne and other notable instructional-design specialists.

These lessons were specially developed to convey relevant AMB information to all members of the Squadron Aircraft Mishap Board. Because AMB membership changes quite regularly with squadron billet and permanent change of station (PCS) rotations, the AMB lesson sequence and

instructional content were designed to allow a newly designated AMB member to commence training at any time during the instructional process. The AMB instructor doesn't have to go-back to AMB Lesson One and start the training segment anew just because a new member joins the board. Lessons build on one another but do not require requisite lesson knowledge for comprehension (Lesson plan instructional content is distinctive in specific lesson substance but cumulative and relevant in relation to other lessons). In addition, the lesson format is designed to provide specific definition and direction to the AMB instructor by supplying lesson objectives, a lesson overview, instructional aids, an instructional outline, additional instructional references, and helpful notes within each lesson framework. The specific content and purpose of each of these lesson elements is defined below.

a. Lesson Objectives

The lesson learning objectives provide the AMB instructor, and the AMB members receiving the instruction, with the intended outcome i.e., knowledge, skill(s), or task(s), of each lesson. In addition, these lesson learning objectives provide a concrete means of evaluating the learned knowledge and/or performance of the AMB. Using the learning objective as the criterion for evaluation, a measure of AMB knowledge and/or skill can be obtained.

b. Lesson Overview

The lesson overview provides a brief comprehensive summary of the purpose of each AMB lesson. The overview gives the AMB instructor a background of the instructional content of each lesson and provides the instructor with a "big picture" examination of the instructional events included in the lesson.

c. Instructional Aids

This section of the lesson provides the AMB instructor with a list of printed media materials (instructions, references, notes, AMB folders, briefs, etc.) needed to adequately teach each lesson. This section also includes recommended non-printed media materials (TV/VCR, slides, etc.) to be used by the instructor, at his/her discretion.

d. Instructional Outline

The instructional outline section of each lesson provides an extensive framework of the instructional (premishap) material to be presented in each lesson. This framework furnishes the AMB instructor with the premishap topics, concepts, principles, techniques, and knowledge to be used while planning and delivering AMB training. Specifically, the four AMB lessons designed for the Aircraft Mishap Board training segment cover the following subjects:

AMB Lesson #1

a. Overview of OPNAVINST 3750.6Q, The Naval Aviation Safety Program

b. Concept of Privilege

c. AMB Individual Mishap Responsibilities

AMB Lesson #2

a. AMB Individual Mishap Responsibilities Review

b. Mishap Site Security

c. Logistical Considerations

d. Mishap Media Factors

AMB Lesson #3

a. Initial Mishap Site Walk-through

b. Mishap Photography

c. Witness Interviewing

AMB Lesson #4

a. Wreckage Diagrams

b. Aircraft Impact Analysis

c. Wreckage Pattern Evaluation

d. Fire Analysis

e. System Analysis Review

e. Additional Instructional References

This section of the four AMB lessons provides the AMB instructor with additional references relevant to the instructional outline material provided within each lesson. Reviewing these (optional) references will give the

AMB instructor a stronger knowledge and understanding of the instructional materials presented in the lesson.

f. Helpful Notes

This section provides the AMB instructor with additional beneficial information to consider when planning and delivering AMB lessons. These "notes" are obtained from the experiences (lessons learned) of several past Aviation Safety Officers and AMB Senior Members. This information is only advisory in nature and is not required in the AMB instructional process.

The combination of all six lesson elements provides the AMB instructor with a instructional format supplying: 1) **why** the instruction is taking place and **what** knowledge and/or performance is required upon completing the instruction; 2) **how** to conduct the instruction and **what** material is required to complete the instruction; and 3) **what** premishap instructional material/information needs to be taught.

The AMB training lessons developed in this segment used primarily four instructional material references. These references are listed as follows:

1. Office of the Chief of Naval Operations, Department of the Navy, OPNAVINST 3750.6Q, *The Naval Aviation Safety Program*, August 1989.
2. Aviation Safety Programs, Naval Postgraduate School, *Aircraft Mishap Investigation*, June 1992.

3. Technical Manual Safety Investigation Volume I, USAF AFP 127-1, NAVAIR 00-80T-116-1, *Mishap Investigation*, May 1987.

4. Technical Manual Safety Investigation Volume II, USAF AFP 127-1, NAVAIR 00-80T-116-2, *Investigative Techniques*, May 1987.

C. SQUADRON DUTY OFFICE TRAINING

1. Duty Office Overview

There are, it seems, two separate crises to contend with when an aircraft mishap occurs. The first is to cope with the incident itself; coordinating Search and Rescue efforts and/or aircraft recovery, notifying all required personnel and organizations, and completing the essential voice and written reporting requirements. The second crisis is to deal with the aftermath of the mishap. Organizing the investigative effort, managing the flood of telephone calls from worried spouses, friends, and relatives, in addition to dealing with the press and the media.

The Squadron Duty Office is normally the first squadron unit notified of an actual squadron mishap and is the squadron entity most likely to deal with both crises mentioned above. This unit, normally comprised of a Squadron Duty Officer (SDO)/Operations Duty Officer (ODO), an Assistant Squadron Duty Officer (ASDO), and a Duty Driver, are key participants in the successful management of an aircraft mishap. This unit, particularly the Squadron

Duty Officer, needs to be extremely knowledgeable and well-trained on the content, requirements, and scope of the Squadron Premishap Plan to effectively supervise this type of situation. However, because of the ever-changing composition of the unit, training these watch teams can be a remarkably difficult endeavor. Generally, the Squadron Duty Office is manned by rotating crews through the three "watch billets," (SDO, ASDO, and Duty Driver), or by randomly assigning qualified squadron personnel to these positions. Depending on the "watchbill" for any given month, the actual watch team composition could vary for every shift every day. This of course is a worst-case training scenario, but it does reveal the variability of the duty office watch team.

It would be impossible for the Squadron Aviation Safety Officer to conduct duty office training everyday to account for this duty office variability. The ASO has numerous other safety and squadron-related responsibilities that require his/her attention. However, certain training techniques can be employed by the ASO to ensure effective and efficient premishap training of squadron duty office watch teams. This is accomplished in the duty office training segment by providing a specific example of an actual duty office watch team drill. The reader is taken through the appropriate steps of the exercise, in detail, to allow for complete comprehension of relevant duty office

watch team training and evaluation procedures and requirements. The design and development of this segment of the training program uses squadron safety personnel, in cooperation with the squadron Senior Watch Officer, to plan, administer, and evaluate the premishap plan knowledge and skills possessed by squadron duty office watch teams. An evaluation of the instructional format used in accomplishing this training follows.

2. Instructional Format

The principle method used in conducting duty office premishap training was developed in three distinct phases. These phases, listed in order of occurrence, are as follows:

1. Self-instruction or self-study of the squadron premishap plan accomplished by the individual squadron duty office watch teams.
2. Evaluation of watch team premishap knowledge through duty office premishap simulations/"drills."
3. Assessing the effectiveness and the comprehensiveness of both the squadron premishap plan and the squadron duty office training effort by examining simulation feedback. This simulation feedback consists of written evaluations that measure how well each duty office watch team compares to previously established premishap plan performance criteria. This phase provides a method to examine both the current squadron

premishap plan and the current duty office training strategy. The watch team evaluations will identify current deficiencies in these areas and provide a method for reviewing and revising either the squadron premishap plan and/or the duty office training program.

To further define the phases mentioned above, the duty office training segment was subsequently separated into a three-step process. This three-step process was developed to provide an easy-to-understand and an easy-to-use methodology for conducting useful duty office training. Specifically, this three-step process consists of the following:

a. *Duty Office Simulation Preparation*

This process step supplies techniques to promote self-instruction of the premishap plan by the squadron duty office watch teams. In addition, specific simulation planning and organizing information is provided in this section to assist the Squadron Safety Department in accomplishing duty office simulations/drills. This section also recommends the composition of the squadron simulation team: (minimum two members), one member to act as the simulation monitor (positioned in the duty office during the drill), and one member acting as the communications member (receiving all duty office phone communications and role-playing various preassigned characters). The last

(optional) member serves as an information link (a runner) between the simulation monitor and the communications member.

b. Conducting the Duty Office Simulation

This section provides a step-by-step example of a duty office watch team simulation. This format gives a "generic" demonstration of the events and procedures encompassed in an actual duty office simulation. Preplanned simulation conditions are listed in addition to relevant simulation administration suggestions.

c. Duty Office Assessment

The Duty Office Assessment section provides simulation evaluation outlines to be used by the simulation monitor and the communication member in evaluating the squadron duty office drill. These evaluation outlines use standardized premishap plan criteria (taken from OPNAVINST 3750.6Q and several Navy/Marine Corp premishap plans) as the basis for the assessments. In addition, management-based criteria are used in the assessments. Overall watch team performance as-well-as watch team premishap plan knowledge is assessed by the evaluations.

The information provided in this segment of the "Squadron Premishap Training Program" provides the squadron Aviation Safety Officer and Squadron Safety Department with an easy-to-use instructional framework for preparing,

instructing, and evaluating the premishap knowledge and applied skills of the squadron's duty office watch teams.

D. BASE-WIDE PREMISHAP SIMULATION TRAINING

1. Base-Wide Simulation Background

In the event of an actual aircraft mishap, numerous military and civilian departments, commands, and agencies, become involved. Prior specific mishap simulation training is necessary in order to properly coordinate, control, and supervise this confusing and demanding situation. In addition, aircraft mishap simulations allow the squadron and other base departments/commands the opportunity to verify the practicality and usefulness of their respective premishap/emergency preparedness plans. Premishap simulations however, provide not only a means to evaluate squadron, wing, and base premishap/emergency preparedness programs, but also provide a constructive, "hands-on" mishap training environment which provides and stimulates additional learning opportunities. This environment allows the airstation mishap participants to apply their previously learned mishap skills, knowledge, and techniques to a "real world", functional, and coordinated mishap scenario. It also allows these participants the opportunity to practice their actual mishap roles and responsibilities under unique "operational" conditions. Furthermore, premishap

simulations enable participants to meet and interact with one-another, building professional affiliation and working relationships prior to an actual mishap incident. This prior affiliation can be vitally important to mishap command and coordination efforts during the initial chaotic moments following an actual aircraft mishap. Finally, these premishap exercises will allow the simulation participants the opportunity to thoroughly familiarize themselves with all airstation pre/post mishap-related facilities and services.

The purpose of this section of the "Squadron Premishap Training Program" is to provide guidance to assist the squadron safety department in planning, organizing, administering, and evaluating base-wide mishap simulations. In accomplishing this purpose the following two objectives are realized:

1. The premishap simulation provides a verifiable means for the safety department to evaluate the thoroughness and effectiveness of previously administered Aircraft Mishap Board and Squadron Duty Office Watch Team training.
2. The premishap simulation format also provides the instructional setting to transfer the knowledge proficiency gained in the classroom lectures into applied mishap performance skills.

2. Instructional Format

The principle instructional method used in conducting base-wide simulation training was developed in four phases. These phases were designed to provide an unexperienced squadron Safety Department with a framework of procedures and guidance in performing base-wide mishap simulations. The four instructional phases used in this segment are as follows:

1. base-wide simulation planning,
2. organizing the simulation,
3. administering the simulation, and
4. simulation evaluation.

These sections use guidelines and information provided by Transport Canada and the Federal Aviation Administration. A brief outline of the specific topics addressed in each of these four sections is provided as follows:

1. Base-wide Simulation Planning
    a. Definition of Participants
    b. Scope of the Exercise
    c. Procedures to be Taught and/or Exercised
    d. Controlling Organization
    e. Evaluators to be Present
    f. Format of Critiques

2. Organizing the Simulation
   a. Coordination of Participants
   b. Squadron Preparation
3. Administering the Simulation
   a. Simulation Suggestions
4. Simulation Evaluation
   a. Individual Unit Evaluation
   b. Squadron Debrief
   c. Segment Evaluation

This segment of the "Squadron Premishap Training Program" provides sound guidance for squadron Safety Departments to apply before, during, and after the simulation exercise has taken place. Although not completely comprehensive in scope and content, this segment gives simulation planners the necessary information to effectively implement base-wide simulations into their individual squadron's Command Aviation Safety Program.

E. IMPLEMENTATION GUIDELINES

Implementing the three segments of the "Squadron Premishap Training Program" into the existing Command Aviation Safety Program is an important step in the instructional process. However, Naval aviation squadrons all have different administrative, training, and operational requirements that might preclude, delay, restrict, or limit

complete implementation of all segments of the training program. For this reason exact implementation of the "Squadron Premishap Training Program" is left to the discretion of each aviation command's safety department. Nevertheless, general implementation guidelines for the program are subsequently provided for squadron review and consideration. It is important to note that each segment of the premishap training program can be used independently as a "stand-alone program" or collectively as a comprehensive squadron premishap training program.

1. **AMB Training Segment**

WHAT?	The four AMB instructional lessons
WHO?	The Squadron Aviation Safety Officer
WHERE?	Quiet, well-lit, and functional squadron working-space or office.
HOW?	As specified in the individual AMB lessons. However, this training format is predominately lecture-based.
HOW OFTEN?	Recommend one lesson every six weeks during the squadron at-home cycle. This will allow the AMB to complete the entire lesson series twice each year. AMB lessons -through-three take approx y 1.5 hours to complete. AMB lesson takes approximately 2.0 hours to complete.

2. **Duty Office Training Segment**

WHAT?	Duty Office Watch Team simulations/drills
WHO?	Aviation Safety Officer, Ground Safety Officer, and Aviation Safety Petty Officer (Simulation Team). The ASO

serves as the Simulation Monitor, the GSO serves as the Communications Member, and the ASPO to acts as the information runner.

WHERE? Squadron Duty Office

HOW? As specified in the Duty Office Training Program segment.

HOW OFTEN? Recommend one drill every two weeks. This will allow the Safety Department to evaluate a good percentage of the squadron personnel assigned to duty office watch positions without overburdening the individuals conducting the simulations. Duty office simulations/drills should last between thirty minutes and one hour in length.

3. Base-wide Premishap Simulations Segment

WHAT? Base-wide simulations training

WHO? Squadron-designated Simulation Planning Team, to include the Squadron Safety Officer, Aviation Safety Officer, Ground Safety Officer, Aviation Safety Petty Officer, and the Wing Safety Officer.

WHERE? At home and/or deployed/detached airfield. This program doesn't recommend conducting the full-scale simulation at a remotely located "outlying" facility until prior simulation experience is obtained by the squadron Safety Department.

HOW? As specified in the Base-Wide Premishap Simulations segment of the program.

HOW OFTEN? At a minimum, one base-wide simulation should be conducted every year. If possible a simulation should be conducted while deployed/detached to a host airfield.

F. BENEFITS OF IMPLEMENTATION

The most obvious benefit to implementing the "Squadron Premishap Training Program" into Naval aviation squadrons is the increase in squadron premishap knowledge and readiness this program will generate. By providing a functional training vehicle for aviation safety departments to use in managing their respective Command Aviation Safety Programs, this thesis will increase the level and quality of premishap information retained by safety-critical squadron personnel. The outcomes to this training process will include: 1) an increase in the quality of mishap investigations and mishap reporting performed by squadron AMBs, 2) improved squadron duty office watch team efficiency and effectiveness in managing mishap crises, and 3) greater understanding and comprehension of pre/post mishap "safety-awareness" issues realized by all squadron personnel. All of these outcomes result in an increased ability for Naval aviation commands to eliminate aviation hazards thus preserving the human and material resources required to accomplish naval aviation missions--the purpose and the objective of "The Naval Aviation Safety Program." Helping to prevent one additional injury or even perhaps saving one or more lives, is the greatest possible benefit from implementing this program.

G. RECOMMENDATIONS

The methodology used in researching, designing, and developing the "Squadron Premishap Training Program" relied heavily on the first three phases of the ISD model referenced in NAVEDTRA 110A. These phases; analysis, design, and development were incorporated and utilized in the training program's formulation. The fourth phase, implementation, initially commenced in March, 1994. Five Navy and Marine Corp Aviation Safety Officers were given a copy of the "Squadron Premishap Training Program" to incorporate into their Command Aviation Safety Programs. The fifth phase of the process, evaluation/control was not incorporated into the instructional process. A follow-on thesis could utilize the information developed in this thesis and complete the instructional systems development process by thoroughly conducting the implementation and evaluation phases of the model.

Future analysis should be completed to assess the validity and success of the "Squadron Premishap Training Program." A follow-on thesis could examine and report on the measurable premishap knowledge, performance abilities, and attitudinal and behavioral changes resulting from implementation of the "Squadron Premishap Training Program." Evaluation and validation is a necessary step in determining the overall significance of the training program.

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SQUADRON PREMISHAP TRAINING PROGRAM

A-1 AMB TRAINING SEGMENT

A-2 DUTY OFFICE WATCH TEAM TRAINING SEGMENT

A-3 BASE-WIDE PREMISHAP SIMULATIONS TRAINING SEGMENT

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Aircraft Mishap Board Training Segment

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AMB LESSON # 1

1.1 OBJECTIVES

1.11 Given OPNAVINST 3750.6Q, be able to define a naval aircraft mishap and locate the purpose, objective(s), and program concepts of the Naval Aviation Safety Program.

1.12 Given OPNAVINST 3750.6Q, be able to discuss the general content of chapters 1-7.

1.13 Given a list of examples, be able to identify the correct and incorrect uses of privileged information, in accordance with OPNAVINST 3750.6Q.

1.14 Given a list of specific AMB responsibilities, be able to verbally explain and demonstrate the performance of these duties.

1.2 OVERVIEW

This is the first in a set of four AMB lessons developed to provide mishap training for the squadron Aircraft Mishap Board. The purpose of this first lesson is to: 1) familiarize the AMB with the general design and content of OPNAVINST 3750.6Q, THE NAVAL AVIATION SAFETY PROGRAM, 2) to discuss the concept of privilege as it applies to mishap investigation and reporting, and 3) discuss, in-depth, the Aircraft Mishap Board members initial aircraft mishap procedures and specific responsibilities.

The OPNAVINST 3750.6Q review will explain the purpose and objectives of both the Naval Aviation Safety Program and the squadron designated Aircraft Mishap Board. In addition, using OPNAVINST 3750.6Q as a reference, the concept of

privilege, as it applies to mishap investigating and reporting, will be defined and discussed. Finally, because the first twenty-four hours directly following an aircraft mishap is generally the most critical and the most chaotic for an Aircraft Mishap Board, the initial recommended AMB member responsibilities (those duties occurring within the first twenty-four hours) are addressed. Discussion will cover each member's AMB assignments in detail to facilitate total group comprehension of all required AMB duties and responsibilities. Many of these duties, for example, mishap site security, mishap photography, and witness interviewing, will be discussed individually and in greater detail, in the following three AMB lessons. This first AMB lesson should establish the initial foundation for subsequent premishap instruction to build on and develop.

1.3 **INSTRUCTIONAL AIDS**

1.31 The Naval Aviation Safety Program, OPNAVINST 3750.6Q

1.32 AMB member folders, each containing a list of required AMB duties and responsibilities (described and listed in Section 1.4)

1.4 INSTRUCTIONAL OUTLINE

I. Overview of OPNAVINST 3750.6Q

A. Discuss the Purpose of the Naval Aviation Safety Program [OPNAVINST 3750.6Q paragraph 102]

B. Discuss the Objective(s) of the Naval Aviation Safety Program [OPNAVINST 3750.6Q paragraph 103]

C. Define and Discuss 3750.6Q Program Concepts [OPNAVINST 3750.6Q paragraph 105]

1. Define damage and injury,
2. Define hazards,
3. Define hazard detection and elimination.

D. Define and Discuss The Concept of Privilege [OPNAVINST 3750.6Q paragraph 105e]

1. Review the list of improper uses of privileged information, provided in OPNAVINST 3750.6Q, pg 1-5.
2. Discuss the purpose and rationale of designating information as privileged (paragraph 105e(2/3)).
3. Discuss the protection of privileged information (paragraph 105e(4)).

E. Discuss AMB Composition and Utilization [OPNAVINST 3750.6Q paragraph 105c1b, 206]

F. Briefly Discuss the Principal Focus of OPNAVINST 3750.6Q, Chapters 1-7 (use the Table of Contents as a guide for this general review).

II. **AMB Member Responsibilities**

A. Senior Member

1. Proceed to the Squadron Duty Office. Upon arriving, confirm that the initial actions required in the premishap plan have been initiated and/or completed.

   Specifically:

   a. Oprep 3 voice and written messages,

   b. Recall of necessary personnel,

   c. Chain-of-Command notification.

2. Meet and provide direction for squadron AMB members.

   a. Are All members present? If not, appoint other AMB members to divide and complete their duties.

3. Organize security for mishap site.

4. Ensure logistics issues are resolved.

   a. What transportation is needed?

   b. Are communications established with and for the mishap site?

   c. Where is the nearest phone and working area in reference to the mishap site?

   d. Has an on-base AMB working/deliberation area been established?

5. Contact and brief base/mishap assigned photographer.
6. Function as sole "central" mishap information source.
   a. Was it an on-base mishap? Inform base and wing commander's office of this function.
   b. Was it an off-base mishap? Inform controlling custodian's public affairs office of this function.

B. Aviation Safety Officer
1. If able, proceed to mishap site, otherwise proceed to the squadron duty office.
2. Ensure survivors and/or remains are initially being cared for.
3. Control and brief as necessary the on-site security personnel.
   a. Establish single access point to mishap site,
   b. Require Senior Member or ASO approval for personnel access into mishap area.
4. Ensure mishap area is secure/safe for investigation.
   a. Approval from Explosive Ordinance Disposal (EOD),

b. Approval from Fire Department Chief,

c. Approval from local authorities, if required.

5. Mishap site logistical considerations.

a. Ensure a Corpsman is always on-scene if the Flight Surgeon is working elsewhere,

b. Coordinate mishap site survey,

c. Brief photographer on specific photo requirements and on mishap site safety precautions.

6. Locate witnesses and coordinate witness interviews and statements. Conduct witness interviews as necessary.

C. Operations Member

1. Proceed to the squadron Duty Office.

2. Collect and securely stow all flightcrew records. Specifically:

a. Training records,

b. NATOPS jackets,

c. Flightcrew logbooks, and

d. Service records.

3. Collect and securely stow all mission related records and documents. Specifically:

a. Duty Officer's original flight schedule,

b. Flight plan,

c. Weather brief,

d. Aircraft manifest,

e. Travel orders, and

f. Mission briefing guide.

4. Collect and securely stow other miscellaneous items and documents. Specifically:

a. Weather report covering mishap time-frame,

b. Tower radar and voice tapes,

c. FAA/ARTCC radar and voice tapes, and

d. Current NATOPS and OPNAVINST 3710.7M.

5. Assist Senior Member and ASO as directed.

D. Maintenance Member

1. Proceed to the squadron Duty Office.

2. Collect and securely stow all aircraft records. Specifically:

a. Aircraft logbooks,

b. Engine logbooks,

c. Aircraft discrepancy book (ADB),

d. Applicable workcenter VIDS and MAF records,

e. Weight and balance information,

f. Aircraft servicing records, and

g. Fuel, oil, and hydraulic samples.

3. Assist Senior Member as directed.

E. Flight Surgeon

1. If survivors: proceed to the location of the survivors.
   a. Make examinations,
   b. Take medical samples, and
   c. Obtain written statements when feasible.
2. If no survivors: proceed to the location of the remains.
   a. Take medical samples and
   b. Coordinate with local coroner and AFIP for autopsy.
3. If survivors unknown: proceed to the mishap site.
4. Follow guidelines provided in the Flight Surgeon's Aircraft Mishap Investigations Pocket Checklist.

Note: An autopsy is required for all fatalities resulting from a mishap. AFIP (Armed Forces Institute of Pathology) provides the technical expertise to provide important clues from injury patterns such as which pilot was at the controls, etc. [Reference OPNAVINST 3750.6Q paragraph 607c(2)]

1.5 **ADDITIONAL INSTRUCTIONAL REFERENCES**

1.51 Technical Manual Safety Investigation, Volume I, NAVAIR 00-80T-116-1, 1987, Chapters 4 & 6.

1.6 **HELPFUL NOTES**

A. When preparing AMB member to-do folders, make two (2) folders for each position. This allows the member use of one folder and gives the ASO a folder to be distributed in the event of a mishap, just in case an AMB member misplaces the original folder. In addition, provide a copy of all member duties within each AMB member folder.

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AMB LESSON #2

2.1 OBJECTIVES

2.11 Verbally describe from memory, the two primary reasons for employing mishap site security assets.

2.12 Given a Site Security Briefing Checklist, be able to thoroughly brief security forces on required mishap security responsibilities.

2.13 Given mishap site environmental conditions, be able to prepare personal and professional supplies appropriate to work in this environment.

2.14 Given a field mishap kit, be able to identify all items contained within the kit and verbally explain their use.

2.15 Given a list of alternatives, be able to identify the correct interaction procedures, restrictions, and uses of the news media, in accordance with NAVAIR 00-80T-116-1.

2.2 OVERVIEW

The purpose of this lesson is to address mishap site-security issues, logistical considerations including a hands-on inventory of the squadron mishap kit, and to provide specific guidance for interacting and utilizing the local news media. In addition, this lesson will provide a review of the initial AMB member responsibilities discussed in lesson one. Aircraft Mishap Board questions relating to these duties should be addressed in order to ensure complete understanding of these requisite procedures. This lesson, and the two AMB lessons to follow, will address topics,

methods, and principles specific to the aircraft mishap investigation process. Examining the individual segments of the investigative process will facilitate greater AMB understanding of these critical aspects of mishap investigation. AMB participation in lesson discussion is highly encouraged.

The use of specific media devices (photographic slides, overhead transparencies, etc.,) to use in presenting lesson lecture material is left to the discretion of the course instructor.

2.3 **INSTRUCTIONAL AIDS**

2.31 Technical Manual Safety Investigation Volume I, NAVAIR 00-80T-116-1

2.32 Aircraft Mishap Board member folders

2.33 Mishap Site Security Briefing Checklist; Appendix B-1

2.34 Squadron Field Mishap Kit

2.4 INSTRUCTIONAL OUTLINE

I. Aircraft Mishap Board Actions Review

A. Review the Mishap Duties and Responsibilities of each AMB member; list is contained in AMB member folders.

B. Discuss any questions concerning these requirements.

II. Mishap Site Security

A. Define the Purpose of Mishap Site Security [NAVAIR 00-80T-116-1 paragraph 3-10]

1. Preservation of the evidence--the location of pieces of wreckage, their position on the ground, and their appearance, may be vital clues to the cause of the mishap.
2. Safeguard Naval property and classified information.
3. Prevent further injury--denying access to the mishap site to prevent additional injuries. The potential hazards at a mishap site are numerous.

B. Interference With the Wreckage [NAVAIR 00-80T-116-1 paragraph 2-7]

1. List reasons when aircraft parts and components may be moved:

a. Rescuing the injured,

b. Preventing or minimizing fire damage to wreckage,

c. Removing wreckage obstructing essential disaster response vehicles or mishap essential vehicles,

d. Recovering salvageable wreckage or components from an aircraft in the water,

e. Safing weapons, pyrotechnics, etc., fitted to or carried in the aircraft,

f. Dealing with hazardous substances.

C. Safety at the Mishap Site [NAVAIR 00-80T-116-1 paragraph 3-3,3-4,7-2]

1. Explain what actions need to occur prior to the Senior Member assuming mishap on-scene command:

a. Extinguished fire,

b. Removal or location of all survivors,

c. Clearance from on-scene Fire Chief,

d. Approval from explosive ordinance disposal.

NOTE: AMB work should commence after disaster response phase ends.

2. Discuss the possible hazards at the mishap site:

a. Munitions--ordnance, CADS, flares, etc.,

b. Pressure vessels--oxygen, CO^{2}, landing gear,

c. Flammables and toxins--batteries, fluids,

d. Composite materials--[Reference NAVSAFECEN message, Aircraft Mishap Investigation, pg 17],

e. Sharp metal pieces and broken glass,

f. Natural hazards--sunburn, poison ivy, snakes.

NOTE: All personnel at mishap site should be briefed on these hazards prior to commencing site operations (See Appendix B-2). Also, always ensure a corpsman is on-site for possible investigation-related injuries.

D. Discuss Establishing Mishap Site Security Forces [NAVAIR 00-80T-116-1 paragraph 2-8,6-6]

1. Site security for an on-base mishap:

a. Utilize base police, squadron personnel, etc.,

b. Armed guards can be authorized by Base C.O.

2. Site security for an off-base mishap:

a. Coordinate with local law enforcement agencies,

b. Support effort with nearest base security forces,

c. If there is a possibility of classified material at the crash site, the site may be

declared a National Defense Area (NDA). If an NDA has been declared, posted, and marked, "reasonable force" can be used to prevent entry into the area.

Note: Check with local JAG and security police to define "reasonable force."

3. Security personnel at the mishap site:
   a. Number of personnel needed is determined by the mishap area size and number of shifts required,
   b. Briefing--personnel assigned to guard wreckage need to be briefed on site security requirements.

Note: Reference Site Security Briefing Checklist listed in Appendix B-1.

III. **Logistics**

A. Discuss Transportation Issues

1. Utilize Base Transportation Office and Base Operations assets for vehicles, mishap site-transportation, or other transportation issues.
2. If the crash site is remotely located enlist the assistance of other commands and agencies (Helicopter squadron, Reserve Unit, etc.).

B. Address Communications Issues [NAVAIR 00-80T-116-1 paragraph 6-15b]

1. Radios--appropriate several two-way hand held radios. Mishap vehicles should be two-way radio equipped.
2. Obtain cellular phones if possible. Contact Base Operations or Base Electronics for assistance.
3. Hammer Ace--lightweight, portable communication system for remote-site secure communications.

Note: Hammer Ace is available 24 hours a day. Contact HQ AFCC/XORCP, Command Post, Scott AFB IL, A/V 576-2591, COMM (618)256-2591.

C. Discuss Personal and Professional Supply Considerations [NAVAIR 00-80T-116-1 paragraph 4-84,85,86, 6-15c]

1. Personal supplies--working gloves are essential equipment. Pack clothing appropriate for the environment (terrain, temperature, vegetation, precipitation, etc.).

Note: NAVAIR 00-80T-116-1 paragraphs 4-85 and 4-86 provide a list of recommended investigator survival items. Also, survival equipment may be available through Base Supply.

2. Field Mishap Kit [Aviation Safety Programs, Aircraft Mishap Investigation, Appendix A]

a. Display mishap kit and discuss its contents.

Note: Recommended Field Mishap Kit inventory is included in above reference, page A-2. Additional materials may be included in the mishap kit as required.

IV. **News Media**

A. Discuss the Function of the Public Affairs Officer [NAVAIR 00-80T-116-1 paragraphs 2-9, 3-9, 3-21]

1. Establishes single point of contact for news media, which initially releases senior member of these duties.
2. Minimizes public reaction to a mishap by providing timely, well developed information to the media.
3. Informs public of current Navy prevention and safety measures as well as information concerning the mishap.

B. Discuss Board Member Interaction with the Press

1. Never speculate about the cause of a mishap.
2. If pressed by a reporter, explain that only a mishap board is qualified to determine the cause.

3. Refer all specific mishap questions to the PAO or Senior Member for comment.

C. Address the Cautions Concerning the Media at the Mishap Site [NAVAIR 00-80T-116-1 paragraph 3-9]

1. Unauthorized photography, publication, or possession of classified information by the media.
2. Premature release of survivor/fatality information by the media.
3. The media can physically interfere with the mishap investigations effort.

D. Address the Helpful Applications of the Media

1. Providing initial photographs of the crash site prior to the AMB's arrival.
2. Identifying and contacting witnesses, and amateur photographers who may have valuable testimony or photographs/video related to the mishap.
3. Recovering parts that have been removed from the crash site or found elsewhere by requesting public assistance through news releases.

Note: Aviation Safety Programs, Senior Member Guide, contains initial recommended media release information and guidance.

2.5 **ADDITIONAL INSTRUCTIONAL REFERENCES**

2.51 Technical Manual Safety Investigation, Volume I, NAVAIR 00-80T-116-1, 1987, Chapters 2-4, 6.

2.6 **HELPFUL NOTES**

A. Include a Site Security Checklist, Appendix B-1, in the AMB member folders. Also, inventory the field mishap kit for completeness prior to conducting lesson 2 instruction.

B. Coordinate with Base Operations, Base Supply, Base Security, and Base Transportation to verify what level of assistance, on-base and off-base, they can provide given a squadron mishap.

AMB LESSON # 3

3.1 OBJECTIVES

3.11 Given a list of acceptable and unacceptable investigation situations, be able to identify the "Do's and Don'ts," and select the correct investigation practices.

3.12 Given a defined naval aircraft mishap, be able to present an overview of the steps taken by the AMB during the initial walk-through phase of a mishap investigation, in accordance with NAVAIR 00-80T-116-1.

3.13 Given a defined naval aircraft mishap, be able to determine what physical evidence at the mishap site needs to be photographed in accordance with NAVAIR 00-80T-116-1.

3.14 Given mishap photographs containing privileged information, be able to examine and use these photographs in accordance with OPNAVINST 3750.6Q.

3.15 Given a defined naval aircraft mishap, be able list the resources available for use in locating potential mishap witnesses.

3.16 Given an Advice to Witnesses statement, be able to conduct mishap witness interviews in accordance with OPNAVINST 3750.6Q and NAVAIR 00-80T-116-1.

3.2 OVERVIEW

The purpose of this lesson is to provide an introduction to the AMB investigations process. This lesson begins by explaining the process of the initial mishap site walk-through. By referencing the Mishap Do's and Don'ts Brief, acceptable and unacceptable conduct at the mishap site is reviewed. These investigative practices, taken from NAVAIR 00-80T-116-1, are additionally listed in Appendix B-

2. The reasons for the walk-through and the techniques utilized during this phase of the investigation will be addressed. In addition, detailed discussion relating to mishap photography, as well as witness interviewing will be examined. Photography is useful to the mishap investigation because it provides a tool for the investigators, supplies documentation of the mishap, and it educates people who could not observe the mishap scene first-hand. Witness interviews and associated techniques need to be discussed because interviewing is one of the most difficult and least understood tasks of an investigating board. Witnesses can provide valuable mishap information, but if the interview is improperly handled, this information may be lost or incorrectly presented.

This lesson should provide the AMB members with the necessary knowledge and techniques to perform an initial site walk-through, effectively manage the photography effort at a mishap site, and perform written and verbal witness interviews. The initial site walk-through, mishap photography, and witness interviewing are all critical elements in the mishap investigations process and should be treated accordingly. In presenting these issues, put forth the required time and energy to fully explain and explore the details pertaining to these issues. The quality and effectiveness of potential mishap investigations could rely

on this detailed, prior training. The next lesson, lesson four, will address specific mishap site analysis and field investigation techniques.

3.3 **INSTRUCTIONAL AIDS**

3.31 Technical Manual Safety Investigation Volume I, NAVAIR 00-80T-116-1

3.32 Aircraft Mishap Board member folders

3.33 Investigation Do's and Don'ts Brief; Appendix B-2

3.34 Television, VCR, and Video Tape of Witness Interviewing Techniques (optional; refer to Helpful Notes)

3.4 INSTRUCTIONAL OUTLINE

I. Initial Mishap Site Walk-Through

A. Discuss Prewalk-Through Considerations [NAVAIR 00-80T-116-1 paragraph 6-14]

1. Review Investigation Do's and Don'ts Brief [Appendix B-2]

B. Discuss Process of Initial Walk-Through [NAVAIR 00-80T-116-1 paragraph 7-3f]

1. Start from the initial impact point. Observe the wreckage distribution and terrain. Make notes or tape record initial impressions about site.
2. Conduct a general inventory of the aircraft. Locate all major aircraft components to determine whether the aircraft was intact at impact.
3. Carefully tag and identify all parts easily identifiable; this will provide a basic wreckage pattern.
4. Do not disturb or remove any wreckage unless necessary.
5. Attempt to recover the flight data recorder (if available). Before removing it from the site, document its position and physical condition.

6. Be alert for objects that are not part of the aircraft. A foreign object in the aircraft could be the cause or a causal factor related to the mishap.
7. Protect all physical evidence from further damage. Edges of broken surfaces should be covered and kept away from contaminants such as fuel, oil, etc.
8. Check all cockpit controls, selectors, switches, and handles; note and photograph their positions. Note and photograph the undisturbed readings of all instruments and indicators. Do not change settings or position of any control, switch, dial, or other component. Aircraft settings and configuration upon impact provide important investigation information.
9. Recover and protect any evidence likely to disappear or change with time. Wreckage and ground scars should not be disturbed until all necessary evidence is gathered. Photograph evidence before disturbing its position. Fluid samples, fire debris, soot patterns, and light bulbs are examples of evidence that may be lost with time.

II. **Mishap Site Photography**

A. Discuss Mishap Site Photographic Requirements [NAVAIR 00-80T-116-1 paragraph 7-9, Chapter 9]

1. The photographer--usually the squadron or base photographer. An Experienced photographer but probably not experienced with mishap photographic requirements. An AMB member should always accompany and supervise the photographic effort. Insist that the photographer use color film for mishap photos!

2. Photographic phases and priorities--shoot perishable photos first i.e., burning wreckage, fire pattern. At a minimum shoot the following items:

   a. Aerial view of mishap site,

   b. Overall mishap site from ground level,

   c. Impact marks,

   d. Cockpit switches and controls,

   e. Aircrew remains prior to removal,

   f. Major aircraft components,

   g. Suspect parts, as they are identified,

   h. Wreckage, prior to removal,

   i. Property damage,

   j. AMB analysis and reconstruction efforts.

Note: Prints and negatives of deceased need to be transferred to the AMB medical member. [Reference OPNAVINST 3750.6Q paragraph 717, pp. 7-14]

B. Address AMB Directed Photographic Techniques

1. The photographer should handle the general photo techniques while the AMB provides photo guidance for framing, perspective, detail, and location.
2. Overshoot and underprint--its always better to have an excess of photographic evidence. Film is cheap, printing is the expensive part!
3. Start from an overall perspective and work to the closeup or reconstruction.
4. Use a ruler or color scale for size comparison. When available, compare a good part with the bad part in the same photo.
5. Utilize a studio whenever possible, especially for photographs of specific detail or photos requiring different views or angles.
6. Record on a notebook, tape-recorder, or placard the location, subject, and date of the photograph.

Note: If you can locate prior (old) mishap investigation photographs depicting these techniques, show them to the AMB while you discuss these topics.

C. Discuss Privileged Photos v. Non-Privileged Photos [OPNAVINST 3750.6Q paragraph 709, 717]

1. Examples of privileged photographs:
   a. Autopsy photographs of numan remains,
   b. AMB staged photographs,
   c. AMB comparison photographs,
   d. Photographs showing AMB deliberation.

Note: Captions and markings placed on photographs that are indicative of the AMB's deliberative process are privileged. The captions and markings only, not the photographs themselves.

2. Examples of non-privileged photographs:
   a. Evidence as it is found in the field, even if it clearly shows a possible causal factor,
   b. Photographs generated by NADEP for engineering investigations, etc.,
   c. All other photographs not mentioned above.

III. **Witness Interviews**

A. Discuss the Purpose of Interviewing and Types of Witnesses [NAVAIR 00-80T-116-1 paragraph 8-2, 8-7]

1. The AMB interviews mishap witnesses for three basic reasons:
   a. Find out what the witness knows,
   b. Establish preliminary causal factors,
   c. Complement other investigation phases.
2. Three basic classifications of witnesses:
   a. The participant; person actually involved in the mishap.
   b. The observer; person not actively involved in the mishap but was present at the time of occurrence.
   c. The expert; someone who possess expert technical knowledge critical for AMB deliberations.
3. Possible witness candidates:
   a. Aircrew,
   b. Passengers,
   c. Tower personnel, line maintenance personnel, runway duty officer, etc.,
   d. Background, character witnesses (family, friends),
   e. Civilians in the vicinity of the mishap.

B. Address Locating Witnesses and Witness Timing Issues [NAVAIR 00-80T-116-1 paragraph 8-4,6,8]

1. Obtain witness statements as soon as possible:
   a. The witnesses memory of the mishap can diminish over time,
   b. The witnesses story might change after comparing accounts with another witness,
   c. Aircrew statements should be taken as soon as possible, with consideration for their physical and mental condition.
2. Locating witnesses:
   a. Interview witnesses currently at the mishap site,
   b. Use the media, local police force, ATC, and known witnesses to locate additional witnesses.

C. Discuss Witness Interviewing Techniques [NAVAIR 00-80T-116-1 paragraphs 8-10 through 8-22]

1. Setting the atmosphere for the interview:
   a. Set the witness at ease; offer them coffee, soda, etc.
   b. Revisit the scene of the mishap; puts the witness back in the same element as when the mishap occurred. Also works as a memory

enhancer, supporting retrieval of mishap events.

c. Conduct the interview in a quiet, non-threatening room, (if unable to revisit the scene).

2. Conducting the interview:

a. Inform the witness of the concept of privilege,

b. Inform the witness that you desire to record the interview,

c. Let the witness start at a point in time well before the mishap. Let them talk all the way through the mishap without interruption. Witnesses should be encouraged to tell all they know about the mishap in their own words. Don't lead the witness through the interview.

d. Ask questions after both you and the witness listen to the taping of the initial story. Keep the questions simple going from general questions to specific questions.

e. Conclude the interview by asking, "Can you think of anything else we haven't covered?" Be courteous and end the interview by

providing the witness with your phone number and address for additional information that might be recalled at a later time.

Note: NAVAIR 00-80T-116-1 paragraph 8-21 provides specific interviewing techniques that should be reviewed prior to conducting an interview.

3.5 **ADDITIONAL INSTRUCTIONAL REFERENCES**

3.51 Technical Manual Safety Investigation, Volume I, NAVAIR 00-80T-116-1, 1987, Chapters 7-9.

3.52 Aircraft Mishap Investigation, Aviation Safety Programs, Lessons 4 & 5.

3.53 Aircraft Mishap Witness Interviewing Techniques, LCDR D.J. Thorn, NAVSAFCEN, reproduced in Aviation Safety Programs, Aircraft Mishap Investigations, page 45.

3.6 **HELPFUL NOTES**

A. As mentioned above, if you can locate prior mishap photographs to show to the AMB members during the photographic portion of the lecture, this will provide strong visual reinforcement of lecture material.

B. Time permitting, conduct several mock witness interviews among the AMB members. If you have the ambition and have access to video equipment you could create your own witness interviewing video for the AMB's use. This media format will provide a self-edited and well-structured witness interviewing tool.

C. NAVAIR 00-80T-116-1 paragraph 8-12 provides a list of recommended interviewer items (interview kit).

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AMB LESSON # 4

4.1 OBJECTIVES

4.11 Given a defined naval aircraft mishap, be able to construct and analyze a mishap wreckage diagram in accordance with NAVAIR 00-80T-116-1/2.

4.12 Given a defined naval aircraft mishap, be able to determine from the physical evidence at the mishap site, aircraft speed, direction, configuration, aircraft attitude, and angle of impact, at the time of the mishap, in accordance with NAVAIR 00-80T-116-2.

4.13 Given a defined naval aircraft mishap, be able to determine from the wreckage pattern at the mishap site, if an in-flight structural failure occurred and/or what was the aircraft's condition of flight at impact.

4.14 Given a defined naval aircraft mishap in which there is evidence of fire, be able to distinguish between in-flight fire and ground fire, as defined in NAVAIR 00-80T-116-2.

4.15 Given a defined naval aircraft mishap and NAVAIR 00-80T-116-1/2 as a reference, be able to examine and analyze aircraft systems and components to determine their role as a causal factor in the mishap.

4.2 OVERVIEW

This is the last in a set of four AMB lessons developed to provide relevant mishap training for the squadron Aircraft Mishap Board. The purpose of this lesson is to introduce the concepts and principles associated with conducting mishap field investigations to the Aircraft Mishap Board. Initially, the use and development of wreckage diagrams is discussed. Wreckage diagrams are a valuable investigation tool because they provide information

that helps to determine if the aircraft's impact with the ground is related to the mishap (aircraft might have impacted the ground as a result of ...), or if there is some question about the survivability of the accident. Aircraft impact determination techniques are also discussed in this lesson. Determining the speed, direction, attitude, configuration, and aircraft impact angle at the time of the mishap, can be critical information in determining mishap cause. Additionally, field investigation fire analysis and wreckage pattern evaluation methods are addressed in this lesson. Fire analysis provides a means of verifying whether an in-flight fire existed prior to the mishap or if the fire was just a result of the aircraft impacting the ground. Mishap wreckage pattern evaluation provides set procedures for examining and evaluating the aircraft's condition of flight at the time of impact. Determining whether the aircraft crashed due to an in-flight structural failure or was in a spin, stall, or inverted flight condition at the time of impact can all be valuable clues in identifying the cause of the mishap. Finally, the lesson concludes by briefly reviewing NAVAIR 00-80T-116-2. This review provides a brief description of the specific topics contained within this reference. Specific system and component analysis training is not provided in this AMB lesson set but is

highly encouraged if additional AMB training time is available. NAVAIR 00-80T-116-1/2 provides all the technical information required to accomplish this training.

4.3 **INSTRUCTIONAL AIDS**

4.31 Technical Manual Safety Investigation Volumes I & II, NAVAIR 00-80T-116-1/2

4.32 Aircraft Mishap Board member folders

4.33 Wreckage Diagrams (specific diagram examples are provided in Aviation Safety Programs, Aircraft Mishap Investigation, pages 53-56)

4.34 Type Model of Squadron Aircraft (refer to Helpful Notes)

4.4 INSTRUCTIONAL OUTLINE

I. Wreckage Diagrams

A. Discuss the Purpose of Wreckage Diagrams [NAVAIR 00-80T-116-1 paragraph 4-23; Diagramming The Wreckage Scene, by Richard H. Wood]

1. Determine if all aircraft parts are accounted for.
2. Determine if the aircraft was in controlled or uncontrolled flight at the time of impact. (This is discussed further in the next section.)
3. Determine the path and the origin of an aircraft in-flight fire.
4. Assist in in-flight aircraft structural failure reconstruction.
5. Determine how aircraft came together (collided) in a mid-air situation.

Note: Aerial photographs and large scale maps may be used in conjunction with or as an alternative to wreckage diagrams.

B. Discuss the Types of Wreckage Diagrams [Aviation Safety Programs, Aircraft Mishap Investigation, pages 51-56]

1. ASO rough draft--an initial rough diagram to be used by the AMB until a formal AMB, public works or military surveyor diagram is completed [pg. 53].
2. Polar wreckage diagram--used for high angle of impact mishaps (greater than 45 deg.), a circular style diagram [pg. 54].
3. Teardrop wreckage diagram--used for low angle of impact mishaps (less than 45 deg.), a center reference-line diagram [pg. 55].
4. Grid wreckage diagram--used in dense, or extremely large mishap areas [pg. 56].

Note: Diagram examples, in addition to diagram *plotting and sketching instructions*, are provided on the reference pages provided above. Also refer to additional instructional reference 4.51.

C. Examine the Information Included on a Standard Wreckage Diagram [Aircraft Mishap Investigation, page 52]

1. Apparent flight path direction,
2. Magnetic north orientation,
3. Landmarks and topography,
4. Impact point and ground scars,

5. Significant aircraft parts,
   a. Four corners of the aircraft,
   b. Engines, props, and blade tips,
   c. Flight control surfaces and actuators,
6. Aircrew locations,
7. Ground fire boundary,
8. Witness locations,
9. Prevailing wind,
10. Sun and moon position and phase.

II. **Impact Analysis**

A. Discuss the Methods Used in Determining Aircraft Speed and Direction at the Time of Impact [NAVAIR *00-80T-116-2 paragraph* 1-3, 1-4, 1-5]

1. Wreckage pattern evidence--the overall length and shape of the wreckage pattern, impact point in relation to pieces of the wreckage, can provide an indicator of aircraft direction at the time of impact. In addition, the size of the pattern can also provide a good indication of aircraft speed at the time of impact. If the speed is low, the pattern will be relatively small and visa-versa.

2. Size and number of wreckage pieces--generally, the smaller the size and the greater the number of wreckage pieces, the faster the speed.

Note: High-speed impacts result in a large pattern with small pieces. Low-speed impacts result in small patterns with big pieces.

B. Define Angle of Impact and Discuss the Methods Used in Determining Impact Angle [NAVAIR 00-80T-116-2 paragraph 1-4, 1-6,1-7]

1. The angle of impact is the angle formed by the velocity vector (flight path) and the terrain surface. It is not likely to be the same as the aircraft attitude at impact [Refer to NAVAIR Figures 1-1 through 1-7].
2. The angle of impact is important in estimating the maneuver being flown or the amount of energy absorbed during the impact with the terrain. Energy absorption is a major issue when evaluating crash survivability.
3. Determining flight path angle--this is generally estimated by examining damage to obstacles along the flight path and the ground scar or impact point [Refer to NAVAIR Figures 1-8 through 1-10].

4. Steep impact angles--impact angles greater than 45° generally leave a circular crater with numerous small pieces. High mass density parts will be buried in the crater. Leading edges, if found, will show severe compression. The depth of the crater will vary with the composition of the soil or rock.
5. Shallow impact angles--impact angles less than 45° generally leave a long and narrow wreckage pattern. The ground scar may consist of several long gouges in the ground and a flat, shallow crater. High mass density parts will possibly be found furthest down the flight path line.

C. Discuss the Methods Used in Determining Aircraft Attitude and Configuration at Impact [NAVAIR 00-80T-116-2 paragraph 1-8, 1-9, 1-17]
1. Aircraft attitude at the time of impact can be determined by comparing ground scars that might contain aircraft wreckage pieces (aircraft skin, red or green navigation lights, wing hinges, etc.) with actual aircraft damage.
2. Obstacles along the flight path should be examined for damage that reflects aircraft nose or bank attitude.

3. The dispersal pattern of the wreckage may provide additional clues as to the attitude of the aircraft at impact. For example, if a separated wing is found closer to the initial impact point than the rest of the wreckage, maybe this wing hit first and detached from the aircraft, supporting a wing-down attitude at impact theory. Corresponding ground scars might support this hypothesis.
4. Aircraft configuration at the time of impact can be determined by noting current flap, gear, trim, etc., positions. Flight control actuators should be examined to verify aircraft impact configuration.

   Examine and document flight station controls to further analyze aircraft impact configuration.

Note: Witness interviews can help in conducting and/or supporting impact analysis.

III. **Wreckage Pattern Evaluation**

A. Discuss the Characteristics of an In-Flight Structural Failure [NAVAIR 00-80T-116-2 paragraph 1-10, 1-12]

1. Missing aircraft parts or components--if a critical aircraft part or component (control

surface, wing section, empennage, etc.) cannot be found at the site or is found back along the flight path short of the impact point then structural failure is probable.

2. Unusual impact angle or attitude--if analysis of the impact angle or impact attitude indicates an unusual ground impact (aft-first, side-ways and inverted, etc.,) then in-flight structural failure is considered.

B. Discuss the Methods of Identifying Spins [NAVAIR 00-80T-116-2 paragraph 1-10, 1-11]

1. Wreckage pattern is small and concentrated.
2. Depth of the relatively shallow impact ground scar will depend on the aircraft's weight and vertical speed in a spin, in addition to the composition of the terrain.
3. Rotational energy of the aircraft will be obvious:
   a. The outside wing may be thrown forward during the impact,
   b. The inside wing will normally take the brunt of vertical collision with the ground,
   c. The vertical tail may fall in the direction of rotation when the rotation is stopped by impact,

d. Obstacles to the flight path will reflect its vertical nature.

IV. **Fire Analysis**

A. Discuss the Characteristics of an In-Flight Fire [NAVAIR 00-80T-116-2 paragraph 15-7]

1. Temperature in excess of 2000°F--this will melt materials that could not be melted in a ground fire. NAVAIR Volume 2, Table 15-4 provides the melting points of common aircraft materials.
2. The products of combustion will follow the airflow slipstream originating from a point source and expanding in a cone or V-shaped pattern. Soot and molten metal will adhere to anything in the path of the slipstream. When soot encounters an obstruction in its aftward flow, such as a rivet head, it may leave a clean, unsooted area on the downstream side of the obstruction.

Note: Soot will not adhere to surfaces hotter than 700°F.

3. Molten metal tends to be splattered and finely dispersed on other parts of the aircraft. This metal is rough looking and can sometimes be easily removed with a knife.

Note: Single characteristics or clues are not valid determinates of an in-flight fire. Look for a pattern of consistent evidence.

B. Discuss the Characteristics of a Ground Fire [NAVAIR 00-80T-116-2 paragraph 15-7]

1. Temperature usually between 1600° and 2000°F, won't melt certain aircraft materials.
2. The flow pattern of the products of combustion is up, sometimes modified depending on the local wind. Molten metal will flow down, pooling into large, smooth puddles of molten material. Soot patterns, if not destroyed by the ground fire, are generally arranged in an upward or inconsistent pattern.

C. Address the Clues at the Mishap Site that Help in Determining What Happened First; the Fire or the Impact [NAVAIR 00-80T-116-2 paragraph 15-7, 15-8]

1. Crumpled parts--if evidence of fire is found inside the folds of crumpled metal, this would suggest that the fire occurred before impact.
2. Fractured edges--if exposure to fire occurred before impact, the edges of parts fractured in the impact should be clean and free of soot.
3. Buried parts--the portion of the wreckage that is buried in the ground at the impact site

should not be exposed to post-impact fire. If this wreckage shows signs of fire damage this is a good indication of an in-flight fire.

4. Mud and soot--in theory, the mud should be on top of the soot in an in-flight fire, and the soot on top of the mud in a post impact fire.

Note: These are only techniques to be used in classifying the fire as either in-flight or post impact. Certain situations could make these investigative methods invalid.

Note: NAVAIR paragraph 15-7(e)4 provides examples of additional fire analysis techniques.

Note: Witnesses can provide good evidence to support or oppose the presence of an in-flight fire.

V. **Volume II, System Analysis Review**

A. Briefly Discuss the Principal Focus of the Technical Manual Safety Investigation Volume II, NAVAIR 00-80T-116-2, Chapters 3-16.

4.5 **ADDITIONAL INSTRUCTIONAL REFERENCES**

4.51 Diagramming the Wreckage Scene, R.H. Wood, reproduced in Aviation Safety Programs, Aircraft Mishap Investigation, pages 57-63.

4.52 Aircraft Mishap Investigation, Aviation Safety Programs, Lessons 6-10, 12 & 13.

4.6 **HELPFUL NOTES**

A. Use the wreckage diagrams provided in Aircraft Mishap Investigations, pages 53-56, during the diagramming portion of the lesson lecture. An alternative to this would be to construct your own versions of these diagrams. This would give the AMB larger diagrams to examine and provide practical diagramming experience to the creator.

B. Using a scale model of the squadron aircraft while presenting the impact analysis of the lesson is recommended. This will provide a better "visual" picture to the AMB during this portion of the lesson plus it will ensure that the squadron has an aircraft model on-hand for witness interviews and other investigative purposes.

C. Because of the technical content of the lesson material, use the Wing/Group Safety Officer to assist with the instruction of this lesson.

APPENDIX A-2. DUTY OFFICE WATCH TEAM TRAINING SEGMENT

Duty Office Watch Team Training Segment

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SQUADRON DUTY OFFICE TRAINING

DUTY OFFICE OVERVIEW

There are, it seems, two separate crises to contend with when an aircraft mishap occurs. The first is to cope with the incident itself; coordinating Search and Rescue (SAR) efforts and/or aircraft recovery, notifying all required personnel and organizations, and completing the essential voice and written reporting requirements. The second crisis is to deal with the aftermath of the mishap. Organizing the investigative effort, managing the flood of telephone calls from worried spouses, friends, and relatives, in addition to dealing with the press and media.

The Squadron Duty Office Watch Team is normally the first squadron unit notified of an actual squadron mishap and is the squadron entity most likely to deal with both crises mentioned above. The Squadron Duty Office, as a unit, is normally comprised of a Squadron Duty Officer (SDO)/ Operations Duty Officer (ODO), an Assistant Squadron Duty Officer (ASDO), and a Duty Driver. These personnel are key participants in the successful management of an aircraft mishap. This unit, particularly the Squadron Duty Officer, needs to be extremely knowledgeable and well-trained on the content, requirements, and scope of the Squadron Premishap Plan to effectively supervise this unusual and possibly

volatile situation. However, because of the ever-changing composition of the unit, training these watch teams can be a remarkably difficult endeavor. Generally, the Squadron Duty Office is manned by rotating crews through the three "watch billets," (SDO, ASDO, and Duty Driver), or by randomly assigning qualified squadron personnel to these positions. Depending on the "watchbill" for any given month, the actual watch team composition could vary for every shift every day. This of course is a worst-case training scenario, but it does reveal the variability of the duty office watch team.

It would be impossible for the Squadron Aviation Safety Officer to conduct duty office training everyday to account for this duty office variability. The ASO has numerous other safety and squadron-related responsibilities that require his/her attention. However, certain training techniques can be employed by the ASO to ensure effective and efficient premishap training of squadron duty office watch teams. By coordinating with the squadron Senior Watch Officer and utilizing squadron safety department personnel and assets in a organized and methodical manner, constructive duty office premishap training can occur.

The principle method presented in this section for conducting duty office premishap training develops in three distinct phases. These phases, listed in order of occurrence, are as follows:

1. Self-instruction or self-study of the squadron premishap plan accomplished by the individual squadron duty office watch teams.
2. Evaluation of watch team premishap knowledge thrcugh duty office premishap simulations/"drills."
3. Assessing the effectiveness and the comprehensiveness of both the squadron premishap plan and the squadron duty office training effort by examining simulation feedback. This simulation feedback consists of written evaluations which measure how well each duty office watch team compares to previously established premishap plan performance criteria. This phase provides a method to examine the current squadron premishap plan and the current duty office training strategy. The watch team evaluations will identify current deficiencies in these areas and provide a method for reviewing and revising either the squadron premishap plan and/or the duty office training program.

The next three sections of the duty office training segment will provide guidance to support the duty office training format presented above. The specific topics addressed are as follows: 1) duty office simulation preparation, 2) conducting the duty office simulation, and 3) assessing both the duty office watch team performance and

the content of the squadron premishap plan. The information provided in these sections will provide the squadron Aviation Safety Officer and squadron Safety Department with an easy-to-use instructional framework to prepare, instruct and evaluate, the duty office watch team.

DUTY OFFICE SIMULATION PREPARATION

The procedures used in preparing a duty office simulation are incorporated in two phases. First, the ASO needs to ensure that premishap training program of self-instruction is in place and working as planned. This can be accomplished by utilizing the following methods:

1. Coordinating with the squadron Senior Watch Officer to incorporate reading the entire premishap plan into the duty office SDO/ASDO qualification process.
2. Implementing, as a standing procedure, that the oncoming SDO read the premishap plan, at a minimum, the SDO immediate action requirements, (first 30 minutes), prior to assuming the watch.
3. Reinforcing watch team knowledge by discussing individual and team mishap actions in accordance with the premishap plan. Inform these watch teams that periodic drills will be performed to evaluate their applied mishap management skills and their knowledge of the squadron premishap plan.

4. Announcing at squadron All Officer Meetings (AOM) that duty office drills will be performed regularly. Work load permitting, conduct one drill every two-weeks, varying the day of the week and the time of day of the drill.

The second phase encompasses the planning and organization of the duty office mishap simulation. This simulation can be an announced, prearranged drill, or it can be an unannounced, surprise evolution. The minimum recommended planning procedures used in organizing the unannounced duty office simulation are listed in the following section. These procedures can be utilized in planning for an announced drill also. Obviously, the only difference will be announcing in advance the time and place of the simulation to the duty office watch team being drilled. Both types of drills, announced and unannounced, have their advantages and disadvantages. However, the unannounced drill tends to produce the truest test of watch team premishap knowledge and preparation, and it best displays the effectiveness and workability of the squadron premishap plan.

Planning and Organizing

1. Prearrange a time with the Commanding Officer and the Operations Officer to conduct the simulation. Ensure that the duty office simulation will not conflict with other squadron training or operational requirements.

2. Construct a simulation scenario to be presented to the duty office watch team. Scenarios can be derived using prior mishaps or constructed by the simulation team. If possible, have all persons participating in the simulation present during this discussion. At a minimum, two persons are required to perform a functional duty office simulation. A three person team is optimal.

3. Divide the duties to be performed during the simulation. Specific duties to be accomplished include:

   a. The drill needs to be initiated. Either by a phone call to the duty office or by a simulation team member personally notifying the duty office of the drill and the mishap scenario.

   b. The duty office watch team's reaction to the drill and their ensuing premishap plan execution needs to be monitored. The monitor member should observe the duty office watch team's coordination in managing the simulated mishap. This member should also ensure that all non-drill related personnel interacting with the duty office, during the simulation, are aware of the

exercise. In addition, this member needs to confirm that all phone calls made by the duty office either go to a preassigned simulation phone contact (internal to the squadron) or, if external to the command, are preceded by the statement; "This is a drill, this is a drill." Note: keeping all communications within the command is the recommended procedure.

c. Establish a point of contact for all duty office phone communications. This person will field all duty office phone communications, from the five-minute OPREP voice message to the duty office mishap recall of squadron personnel. This member will also call the duty office role playing 1) a member of the media, 2) a worried spouse, and 3) a witness to the simulated mishap.

d. Create a means for the duty office monitor to communicate with the simulation communications member. This can be accomplished through the optional third member or by using the duty driver or other available squadron member. This third member can also act as a simulated on-scene squadron witness providing the duty office with prearranged mishap updates.

4. Prior to presenting the duty office mishap simulation, the simulation team should discuss the mishap simulation sequence of events. What will occur and when will it occur? Review the current squadron premishap plan and work through

the first thirty minutes of a mishap. What are the SDO's initial requirements? What are the ASDO's initial requirements? What should the duty driver accomplish during this period? What would be the most effective way of directing the watch team and assigning duty office team responsibilities? These are examples of information to discuss prior to initiating the simulation. This discussion will ensure that everyone conducting the simulation is cognizant of distinct mishap requirements and their specific sequence of occurrence.

Conducting the Simulation

Upon completing the steps recommended above, in addition to any other actions you deem necessary to prepare for the drill, the process of conducting the simulation can then occur.

This section of the duty office premishap training program will give a specific example of a duty office drill. Walking through each event, as it happens, will provide the reader with a generic demonstration of the events and procedures encompassed in a duty office simulation. Note: these events will not cover all possible situations or circumstances resulting from a duty office drill but should provide a general framework for conducting duty office simulations.

Preplanned Conditions

1. Commanding Officer and Operations Officer notified and approve the duty office simulation request.

2. The scenario agreed upon by the three member simulation team is as follows: "Aircraft 00, event # 0 on the flight schedule, departed the runway on takeoff. The aircraft came to rest on the left side of runway 00. No smoke or fire present at the site. Fatalities or injuries unknown at the present time." Updates to this report will include: 1) one known minor injury (broken arm of crewmember) at the scene and 2) major damage to the main and nose landing gear and damage to the left wing.

3. The simulation duties are divided as follows:

   a. The ASO will act as the monitor and administrator for the simulation (3b. above). The ASO will be located in the duty office for the entire simulation.

   b. The Ground Safety Officer (GSO) will take the duties of handling duty office phone communications and role playing callers (3c. above). The GSO will also initiate the drill by phoning the duty office (3a. above). It is recommended that this individual have two different telephone lines for communications--one line to receive duty office telephone communications and the other line to conduct the role playing calls.

c. The Aviation Safety Petty Officer will pass information between the monitor (ASO) and the communications member (GSO). This member will also provide the duty office watch team with simulated mishap updates as the drill progresses (3d. above).

The Simulation Exercise

Event 1

The communications member calls the duty office and recites: "This is a drill, this is a drill. This is the tower calling. Aircraft 00 has just departed the runway and is positioned to the left of runway 00. No smoke or fire is present at the scene. Fatalities and injuries unknown at this time. Crash and rescue is responding. This is only a drill."

Event 2

The monitor enters the duty office at the time of the mishap notification call. The monitor hands the ASDO a note which states: All calls made to #555-5555 (preassigned simulation phone number). The monitor informs the SDO that he is there to administer and monitor the drill and not to participate in its execution.

Event 3

Monitor evaluates the watch team's execution of the squadron premishap plan, taking notes on good areas as well as substandard areas. (A list containing the minimum recommended evaluation criteria is presented in the next section, "Assessing Duty Office Performance").

Event 4

Communications member receives duty office phone reports i.e. OPREP-3 voice report, squadron personnel recall, etc., taking notes on quality, timeliness, and substance of communications. (A list containing the minimum recommended evaluation criteria is presented in the next section, "Assessing Duty Office Performance").

Event 5

Communications member calls duty office and role plays a member of the press. (Specific role-playing information is provided in the next section, "Assessing Duty Office Performance").

Event 6

Communications member calls duty office and role plays a worried spouse or relative.

Event 7

The third team member (ASPO) advises the SDO that there is only one minor injury at the mishap site.

Event 8

Communications member calls duty office and role plays a witness to the simulated mishap.

Event 9

The third team member advises the SDO that there is major damage to the mishap aircraft's left wing. Also, he states that the nose and main landing gear appear to be destroyed.

Event 10

The simulation is terminated. The monitor informs the watch team that they will be debriefed after the simulation team prepares its assessment.

Simulation Suggestions

1. The simulation should last between twenty and forty-five minutes. At a minimum, complete up through the twenty minute OPREP-3 written message.
2. Allow ample time between events for the watch team to react to a specific event. Evaluate the priorities being set by the watch team and observe how they manage and accomplish these different situations.
3. Vary the scenarios to fit realistic operating conditions. Deployment scenarios should differ slightly from at-home scenarios. Remember to make the scenarios realistic and straight-forward. Don't unnecessarily overload an already anxious duty office watch team. Also, whenever possible use

past mishap reports when developing scenarios. Contact the Wing Safety Officer or the Naval Safety Center for relevant Mishap Investigation Report (MIR) scenarios to reference in designing your various simulation exercises.

Duty Office Assessment

The following procedures will establish baseline criteria for the simulation monitor and communications member to use in assessing the watch team performance and their premishap plan knowledge. These criteria are divided into premishap plan criteria and management criteria. These criteria will also provide information to use in updating and revising the squadron premishap plan. Review and amend these criteria as necessary to conform to individual squadron requirements. These guidelines will also provide the communications member with role-playing suggestions to evaluate certain ASDO responses.

A. DUTY OFFICE MONITOR

Premishap Plan Criteria

1. Notification of the Mishap

   a. Does the squadron premishap plan include an aircraft mishap notification checklist?

   ☐ Yes ☐ No Comment_____

   _____

   b. Did the SDO follow the aircraft mishap notification checklist provided in the squadron premishap plan?

   ☐ Yes ☐ No Comment_____

   _____

   c. If so, is this checklist readily available to the squadron watch team and do they all know where to find it?

   ☐ Yes ☐ No Comment_____

   _____

   d. Did the SDO verify that SAR, the crash/fire department, and medical were notified?

   ☐ Yes ☐ No Comment_____

   _____

   If not, make sure the SDO realizes that these departments need to be informed as-soon-as-possible.

   e. Record the time the simulation was initiated and the time when watch team procedures and actions occur, (develop a time-line). Time initiated_____

2. Verification of the Mishap

a. If the notification was given by an individual or unit over the phone (not via the squadron crash phone), did the SDO obtain this individual's name and telephone number and call them back to verify the validity of the report?

☐ Yes ☐ No Comment_____

_____

Note: when in doubt, start the immediate action requirements first, then look to authenticate the notification.

3. Recall and Notification of Essential Personnel

a. Were the Commanding Officer and Executive Officer notified immediately?

☐ Yes ☐ No Comment_____

_____

b. Was the premishap plan recall initiated?

☐ Yes ☐ No Comment_____

_____

Does this list include all required personnel; i.e., ASO, AMB members, Operations Officer, CACO, etc.,

☐ Yes ☐ No Comment_____

_____

Are all names on the recall clearly printed and current with the squadron billet listing?

☐ Yes ☐ No Comment_____

Are all recall telephone numbers clearly printed and up-to-date?

☐ Yes ☐ No Comment_____

_____

4. OPREP-3 Voice Report

a. Was the OPREP-3 report given and was it required? (Depends on the scenario.)

☐ Yes ☐ No Comment_____

_____

b. Was the reporting format correct and was it clearly stated?

☐ Yes ☐ No Comment_____

_____

c. Is an example of this report included in the squadron premishap plan?

☐ Yes ☐ No Comment_____

_____

Is it correct in content/format?

☐ Yes ☐ No Comment_____

_____

Is the reporting authorities telephone number listed and up-to-date?

☐ Yes ☐ No Comment_____

_____

d. Was this voice report given within the 5-minute time requirement?

☐ Yes ☐ No Comment_____

_____

If not, record the time of transmission_____

5. Determine Mishap Classification

a. Did the SDO accurately determine that a mishap had occurred?

☐ Yes ☐ No Comment_____

_____

b. What references did the SDO utilize to determine this?_____

_____

Does the premishap plan include this information?

☐ Yes ☐ No Comment_____

_____

6. Chain-of-Command Notification

a. Did the SDO ensure that the required departments in the squadron's chain-of-command were notified of the mishap?

☐ Yes ☐ No Comment_____

_____

b. Does the premishap plan clearly list these departments and provide up-to-date telephone numbers?

☐ Yes ☐ No Comment_____

_____

7. OPREP-3 Message Report

a. Was the reporting format correct in accordance with OPNAVINST 3100.6?

☐ Yes ☐ No Comment_____

_____

b. Is a skeleton OPREP-3 message provided in the squadron premishap plan?

☐ Yes ☐ No Comment_____

_____

Did the SDO utilize this supporting tool?

☐ Yes ☐ No Comment_____

_____

c. Is an example of a generic Oprep-3 written report included in the premishap plan?

☐ Yes ☐ No Comment_____

_____

Is it correct in content/format in accordance with OPNAVINST 3100.6?

☐ Yes ☐ No Comment_____

_____

d. Was this message report given within the 20 minute time requirement?

☐ Yes ☐ No Comment_____

_____

If not, record the time of message release_____

Note: Have the SDO or directed representative draft-up an actual 20-minute message for the ASO, or duty office monitor, to examine for completeness during the simulation debrief. If possible, put this message format on computer disk and attach it to the premishap plan. This will help speed-up the drafting of this message.

8. Miscellaneous Requirements

a. Was a chronological log of events kept by the SDO or other designated squadron person?

☐ Yes ☐ No Comment_____

_____

Was the log legible and did it contain all necessary information connected with the simulated mishap (phone conversations, message releases, receipts, events and any unusual problems encountered)?

☐ Yes ☐ No Comment_____

_____

Were these events listed promptly and in the order of their occurrence?

☐ Yes ☐ No Comment_____

_____

Duty Office Management Criteria

1. Initial Response

   a. Upon simulated mishap notification, did the SDO know the location of the premishap plan and the emergency action file (if applicable)?

   ☐ Yes ☐ No Comment_____

   _____

   b. Did the SDO have an established plan-of-action to respond to the simulated mishap, (in accordance with the premishap plan)?

   ☐ Yes ☐ No Comment_____

   _____

2. Watch Team Guidance

   a. Did the SDO utilize the duty office watch team effectively by delegating required mishap duties (ASDO start on squadron telephone recall, Duty Driver handle the chronological log, etc.)?

   ☐ Yes ☐ No Comment_____

   _____

   b. Did the SDO solicit assistance from other available squadron personnel?

   ☐ Yes ☐ No Comment_____

   _____

   If so, did the SDO clearly direct them on their responsibilities?

☐ Yes ☐ No Comment_____

_____

c. How efficiently did the SDO execute the premishap plan requirements (how comfortable was the SDO with the plan)?

Comment_____

_____

Additional Remarks

1. The duty office monitor is responsible for the administration of the simulation. This member needs to ensure that the simulation is conducted without interference from outside parties. Post a notice at the duty office informing squadron personnel of the simulation. Also, ensure that all simulation communications are kept in-squadron. If, for training reasons, telephone calls are made to outside commands, ensure that 1) the Commanding Officer approves and 2) all outside communications are prefaced with "This is a drill, this is a drill."

B. COMMUNICATIONS MEMBER

Communications Member Overview

1. The communications member is assigned with receiving all incoming duty office phone communications and recording their time of receipt. Recording the time of all communications will allow the simulation team to develop an accurate time-line to evaluate the duty office watch team's procedural priorities. In addition, this member will role play, at a minimum, three different individuals; a news reporter, a worried relative or spouse, and a potential mishap witness. This role playing exercise will test the watch team's knowledge of information security (privilege), and assess their overall communications proficiency.

Premishap Criteria

1. Notification/Verification of the Mishap

   a. Did the duty office follow the premishap plan aircraft mishap notification checklist?

   ☐ Yes ☐ No Comment_____

   _____

   Did the duty office inform you to stay by the phone so they could call you back and confirm the report?

   ☐ Yes ☐ No Comment_____

   _____

Did they ask for a name and telephone number?

☐ Yes ☐ No Comment_____

_____

Note: The communications member should have a copy of the premishap plan aircraft mishap notification checklist while administering this segment of the scenario. This will confirm completion of all required checklist items.

2. Recall of Personnel

   a. Record the time and order of squadron personnel recalled.

   b. Did the watch team member use the correct recall voice format: "This is the _____ duty office, we are conducting a general recall. Please report to the duty office immediately."

   ☐ Yes ☐ No Comment_____

   _____

   c. Did the watch team member give out any additional mishap information when prompted?

   ☐ Yes ☐ No Comment_____

   _____

   If so, what?_____

   _____

3. Oprep-3 Voice Report

   a. Was the reporting format correct and clearly stated?

      ☐ Yes ☐ No Comment_____

      _____

   b. Was it delivered within the 5-minute time constraint?

      ☐ Yes ☐ No Comment_____

      _____

      Record the time of transmission_____

4. Chain-of-Command Notification

   a. Were all chain-of-command notification calls completed?

      ☐ Yes ☐ No Comment_____

      _____

   b. Was the format correct and clearly stated?

      ☐ Yes ☐ No Comment_____

      _____

Role Playing Information

1. Media Representative

   a. Contact the squadron duty office impersonating a member of the local media. The intent of this character is to obtain as much information from the duty office watch team as possible. Try and acquire crewmember's names, aircraft type, aircraft mission, number of injuries, damage estimates, etc.

b. The duty office should only confirm the report of a mishap of undetermined magnitude and supply the name and number of the squadron and/or wing Public Affairs Officer (PAO) as a point of future contact. The duty office watch team should be polite but should clear the line ASAP to free-up squadron telephone lines.

2. Relative or Spouse

a. Contact the squadron duty office impersonating a relative or spouse of a squadron crewmember who just heard about the mishap. The intent of this character is to obtain as much information as possible from the duty office watch team but from a personally involved third party angle. Be emotional and persistent with this character in attempting to obtain information!

b. The duty office should only confirm the report of the mishap and provide the name and number of the squadron and/or wing CACO and PAO. The duty office watch team should be courteous but not allow the phone line to be tied-up for any length of time.

3. Potential Mishap Witness

a. Contact the squadron duty office impersonating a witness to the simulated mishap. Tell the duty office, in-detail, what was observed.

b. The duty office should ask for the witnesses name and telephone number and ask him or her to please

call back the next day unless contacted by a squadron representative. They should thank the person for calling and then clear the line. The duty office should not allow the potential witness to go through the entire story in detail. Duty office personnel should be quick, courteous, and to the point!

4. Senior Ranking Officer Within the Chain-of-Command (optional).

   a. Contact the squadron duty office impersonating the senior ranking officer within the squadrons chain-of-command. Get as much information out of the watch team as possible. Document what and how information is furnished to this caller. Does the duty office refer you to the squadron Commanding Officer for comment or do they supply all of the answers? Does the duty office verify in any way the validity of this caller (copying the phone number and telephoning this caller back)?

C. POST-SIMULATION DEBRIEFING

1. Upon completion of the simulation, the members of the duty office simulation team need to compare notes and information. By using the criteria given above, evaluate the strengths and the weaknesses of the watch team's performance. Discuss individual performance as well as team coordination and performance issues.

2. When debriefing the watch team (all members), discuss in chronological order, the events of the simulation. Use the assessment checklists presented in the earlier section as a debriefing guide. As the events of the simulation unfold, address both the team's strong points and the team's weak points. Provide instruction on proper team mishap procedures in accordance with the squadron's premishap plan as necessary. The exact format for this debriefing is left to the discretion of the safety department.

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Base-Wide Premishap Simulations Training Segment

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BASE-WIDE PREMISHAP SIMULATIONS

PURPOSE

One way for squadrons to gain requisite mishap knowledge and experience, without the occurrence of an actual squadron aircraft mishap, is to conduct premishap simulations. Such a simulation would entail incorporating the various elements, participants, and considerations associated with an aircraft mishap into a properly designed, planned, controlled, and adequately supervised mishap training exercise. Aircraft premishap simulations can be valuable learning exercises that allow the squadron and other base departments/commands the opportunity to verify the practicality and usefulness of their respective premishap/emergency preparedness plans. Premishap simulations provide not only a means to evaluate squadron, wing, and base premishap/emergency preparedness programs, but also provide a constructive, "hands-on" mishap training environment, which provides and stimulates additional learning opportunities. This environment allows the airstation mishap participants to apply their previously learned mishap skills, knowledge, and techniques to a "real world", functional, and coordinated mishap scenario. It also allows these participants the opportunity to practice

their actual mishap roles and responsibilities under unique "operational" conditions. Furthermore, premishap simulations enable participants to meet and interact with one-another, building professional affiliation and working relationships prior to an actual mishap incident. This prior affiliation can be vitally important to mishap command and control efforts during the initial chaotic moments following an actual aircraft mishap. In addition, these premishap exercises will also allow the simulation participants the opportunity to thoroughly familiarize themselves with all airstation pre/post mishap-related facilities and services.

The purpose of this section of the "Squadron Premishap Training Program" is to provide guidance to assist the squadron safety department in planning, organizing, administering, and evaluating base-wide mishap simulations. In accomplishing this purpose, the base-wide/airstation premishap simulations section will provide the following two elements:

1. The premishap simulation will provide a verifiable means for the safety department to evaluate the thoroughness and effectiveness of previously administered Aircraft Mishap Board and Squadron Duty Office Watch Team training sessions.

2. The premishap simulation format will also provide the instructional setting to transfer the knowledge and skill

proficiency gained in the classroom lectures into applied mishap performance skills. Further explanation of this concept is as follows:

> The Aircraft Mishap Board training lessons given in Appendix A-1 provide the AMB Senior Member/squadron ASO with the materials to administer premishap instruction to the AMB members in primarily a lecture format. The "hands-on" design of a premishap simulation scenario provides the AMB members with an opportunity to actually practice and perform the procedures, techniques, and methods learned during these AMB lectures. Thus, the knowledge learned in the classroom is transferred to applied skills in the simulated environment. The actual application of these learned skills, even though practiced under simulated conditions, is required to effectively perform under actual mishap conditions.

BASE-WIDE SIMULATION PLANNING

Of the topics addressed in this portion of the training program; planning, organizing, administering, and evaluating, planning is probably the most important overall factor in executing a functional and realistic premishap simulation. This section will present several guidelines to consider when planning a full scale mishap simulation. Guidelines, originally developed by Transport Canada [Ref.

18], were adopted for use here.

Definition of the Participants

The first step taken by the squadron safety department in planning a base-wide/airstation mishap simulation is to establish a squadron simulation planning team. This team should include the squadron Safety Officer/Department Head, the Aviation Safety Officer, the Ground Safety Officer, the Aviation Safety Petty Officer (enlisted member), and the appropriate Wing/Group Safety Officer. Once formed, this simulation planning team can initially determine several important items:

1. What squadron departments, workcenters, and individuals need to be included in the mishap simulation. Determining a rough estimate of the number of squadron personnel to be trained and/or used in administering the simulation will define several internal planning issues.

2. What non-squadron commands and departments (crash-fire-rescue, EOD, P[illegible]perations, etc.) should be included in the simulation. This question is clarified further in later discussion when the simulation scenario and the scope of the exercise planning topics are addressed.

A specific list of recommended simulation planning team topics (used by Canadian simulation planners) is listed in the ensuing paragraphs. These guidelines provide an

established and proven planning strategy to be used during the simulation planning process. Also, remember that determining all possible simulation parameters and participants, in addition to the exact scope of the exercise, is determined throughout the planning process. Don't try and complete the entire mishap planning process in one meeting. Thorough planning for this type of evolution will probably take several weeks (or even longer) to complete.

Definition of the Scenario

A realistic, uncomplicated scenario should be developed by the squadron simulation planning team. Prior mishap investigation reports are good sources to use in building simulation scenarios. The Wing Safety Officer should have access to "sanitized" versions of these reports. In addition, the Naval Safety Center, COMM (804) 444-3520, can provide assistance.

Remember, don't over complicate the simulation by over complicating the scenario. Keep it simple and straight-forward!

Scope of the Exercise

Defining the scope of the exercise should be done early-on in the planning cycle. In defining the scope of

Group	Topic	Instructor	Time
AMB	Mishap Site Security	ASO	0:15
AMB	Mishap Photography	Wing Safety	0:15
AMB	Witness Interviewing	ASO	0:30
AMB	Field Investigations	Wing Safety	0:30
AMB	Aircraft Records Analysis	ASO	1:00
AMB	MIR Reporting Requirements	ASO	1:00
Duty Office	General Mishap Duties	GSO/ASPO	UNK
Squadron Security	Site Security Briefing	AMB Senior Member	0:15
Emergency Reclamation Team	General Mishap Duties	Team Supervisor	UNK
PAO	Mishap Support Duties	Safety Officer	UNK
Admin Dept.	Mishap Support Duties	Safety Officer	UNK
CACO	Mishap Support Duties	Safety Officer	UNK
Legal Dept.	Post-Mishap Requirements	Safety Officer	UNK

Table A.1

the simulation, the planning team needs to specify the physical boundaries within which the plan is to operate i.e., off-duty runway, taxiway, outlying field, etc., in accordance with the agreed-upon simulation scenario. In addition, the time-length of the simulation and the amount of interaction with other commands should be specified.

Procedures to be Taught and/or Exercised

Deciding on the procedures/topics to be taught and/or evaluated, in addition to determining who will accomplish the instruction and evaluation is probably the most important and the most time consuming phase in the simulation planning process. During the initial planning phase, prior to meeting with the proposed external participants, it is important to focus on squadron-specific groups, topics, and procedures to teach and evaluate during the simulation. Emphasis here should be placed on the evaluation of previously learned knowledge and skills but because of the superb training environment created by the simulation exercise, select mishap-related training should also occur. Table A.1 is provided to assist in determining what groups, topics, and procedures to incorporate into this process. The information provided in the table above depicts the minimum squadron (internal) departments/groups to include in the simulation exercise. The instructional topics listed for each group provide the recommended topics to be trained and evaluated during the simulation. Specific lesson content is left to the discretion of the respective topic instructor. However, it is recommended that the ASO and the other specified instructors utilize the AMB lesson plans and the Duty Office Watch Team information provided in the first two sections of the "Squadron Premishap Training

Program" when formulating lessons and evaluations for the AMB and the squadron Duty Office.

Note: This program recommends conducting all simulation training and evaluation in the field, i.e., at the specified simulated mishap site. This will allow instructors to take full advantage of the training opportunities provided by the outdoor/operational environment, i.e., statically positioned aircraft, surrounding terrain, vehicle traffic, etc. However, the AMB should conduct the Aircraft Records Analysis and the MIR Reporting Requirement segments in a designated squadron space. These two training segments take place after the conclusion of the "outdoor" simulation exercise (possibly the next day). The ASO and Wing Safety Officer should use OPNAVINST 3750.6Q and Aviation Safety Programs, Aircraft Mishap Investigation as the primary references for constructing these two lesson lectures.

Controlling Organization

Since the squadron is the command initiating and overseeing the conduct of the simulation, unless otherwise specified, the squadron assumes the title of simulation controlling authority.

Evaluators to be Present

Evaluators are a very important part of the entire simulation training process. However, including too many individuals into the scenario increases the supervision and communication workload required to administer and evaluate the scenario. This program recommends using the instructor(s), listed above in Table A.1, as both the instructor and the evaluator for their respective areas of the simulation. Specifically, the units and the evaluators recommended during a simulation (at a minimum) are as follows:

1. AMB--The ASO and Wing Safety Officer are responsible for directing, instructing, and evaluating this unit.
2. Duty Office--The Ground Safety Officer and the Aviation Safety Petty Officer, because of their prior experience conducting watch team drills, are responsible for evaluating this unit.
3. All support functions (PAO, CACO, Legal, etc.,)--The squadron Safety Officer is responsible for directing, instructing, and evaluating these units.
4. Emergency Reclamation Team--The team supervisor and/or the AMB maintenance member (time permitting) are responsible for training and evaluating this unit.
5. Commanding Officer and the conduct of the overall exercise--The squadron Safety Officer is responsible

for up-dating the commanding officer on the specifics of the exercise. This person also oversees and controls the entire simulation process.

Any additional unit/squadron training requested by the command should be assigned to a qualified instructor. The ASO and/or the squadron Safety Officer shall review all instructional lessons and material prior to the simulation.

Format of Critiques

The final guideline that needs to be addressed by the simulation planning team is the format of the performance critiques. In order to properly analyze and interpret the results of the training exercise, the instructors/evaluators need to rate the performance of each squadron group using the same format. This standardized method is necessary to compare and measure the resulting performance of the various squadron units receiving training. This information is also helpful in measuring and examining past simulation performance/outcomes compared to current simulation performance/outcomes (compare past performance to current performance to determine proficiency/deficiency trends).

As per the Navy ISD model, presented in NAVEDTRA 110A, this training program recommends using the numerical (one through five) rating scale to measure specific performance criteria. In addition, a comment section should be provided

after each of these performance ratings and at the conclusion of the critique for additional evaluator suggestions. An example of this format is provided in the "Simulation Evaluation" section presented later. Additionally, Appendix B-3 provides an example of a training evaluation form for use in conducting simulation assessments.

ORGANIZING THE SIMULATION

Once the squadron simulation planning team defines and establishes the guidelines listed in the planning section given above, the simulation organizing effort can commence. The simulation organizational effort is divided into two distinct areas. First, coordinating with the other tenant commands/units who will be participating in the simulation and second, doing the internal preparation work (i.e., developing the AMB and Duty Office simulation training lessons/materials, etc.) required to professionally conduct this premishap training exercise.

Coordination of Participants

Involving other commands and units in the mishap simulation adds both a sense of realism to the scenario and provides all participants with additional mishap training

opportunities. The process of organizing this portion of the simulation takes place in three primary steps. First, contact each prospective simulation participant and inform them of the intended mishap simulation proposed by your command. Provide them with a brief background of the exercise, solicit their participation, and then arrange a meeting for all participants, (the second step). At the initial gathering of all simulation participants (the second step in the process) discuss the squadron's planning elements (i.e., scope, scenario, instruction, etc.) previously formulated by the squadron simulation planning team. In addition, discuss the training requirements proposed by the tenant (non-squadron) participants. Accommodate, scenario and time permitting, as many of these training requests as possible. Conclude the meeting by briefly piecing the simulation scenario together, sequencing and coordinating the participant training and involvement discussed earlier into a "rough draft" proposed schedule of events.

Finally, the coordination effort concludes by conducting one additional meeting of all simulation participants. During this meeting a table-top exercise of the scenario, with all participants responding verbally to their actions, is performed. This table-top rehearsal enables participants to describe the responses and actions

taken by their units throughout the simulation exercise. This format will identify prospective problems, gaps, deficiencies, etc., that need to be resolved prior to administering the actual simulation.

A list of recommended non-squadron participants (depending on the scenario) is as follows:

1. Wing Safety--(Wing Safety Officer is included as squadron simulation planning team member)
2. Base Operations--Operations Officer and Tower Supervisor
3. Crash/Fire/Rescue--Fire Chief or Assistant Fire Chief
4. Hospital/Medical--Flight Surgeon and Medical Officer
5. Explosive Ordnance Disposal--Team Supervisor
6. Base Security--Security Captain or Security Officer
7. Base Public Affairs Office--Base PAO or Assistant PAO
8. Base Command Representative--Contact Chief of Staff for representative (Base Operations Officer may satisfy this requirement)

Squadron Preparation

Preparing, editing, and reviewing the specific instructional materials to be taught during the mishap simulation is an important segment of the training process. These topics, identified during the "procedures to be taught" segment discussed earlier, need to be developed and

reviewed prior to application. As mentioned earlier, the lessons and information given in the first two sections of the "Squadron Premishap Training Program" (Appendix A-1 and A-2) provide most of the AMB and duty office instructional material required for this task.

In addition, this phase includes the refinement of the simulation scenario (originally developed during the initial planning process) and the development of all supporting scenario materials. This process involves developing a scenario "master plan" describing the step-by-step agenda of the entire simulation scenario, in addition to formulating a "participants script" to be used by the actual scenario actors/role-players i.e., aircraft crewmembers, witnesses, tower personnel, etc. The "master plan" covers the entire mishap scenario process providing a complete time-line of the simulation events while the individual "scripts/cue cards" given to each simulation role-player describe the background and/or level of involvement for each particular participant. For example, the tower witness might be given a "cue card" stating the following information:

> "The aircraft was cleared for takeoff, the aircrew acknowledged the clearance and started the aircraft on it's takeoff roll. Next thing I knew the aircraft was skidding off the left side of Runway 00 (duty runway). I immediately contacted crash/rescue, etc., via the crash

phone system. Shortly after, about thirty seconds, the aircraft declared an emergency. I didn't see anyone depart the aircraft. I did notice a little black smoke emanating from the aircraft." "Note: Don't make-up any additional facts. If asked a question you're unsure of, state you don't know or don't remember. Thanks for your assistance."

These "cue cards" should be comprehensive enough to supply the simulation role-players with a solid narrative background for their specific character without supplying unnecessary detail. Remember, each role-player should either directly support the legitimacy of the scenario or provide a specific training purpose (i.e., role-playing a prospective witness to evaluate interviewing techniques, or role-playing a media member to evaluate public relations capability). Don't over burden the preparation process by including unnecessary participants. Keep it simple!

ADMINISTERING THE SIMULATION

After all of the previously mentioned planning issues have been addressed, the simulation instruction is developed and reviewed, and a review of the scenario performed by all participants, the actual execution of the exercise can occur. This portion of the training program is designed to

provide the squadron safety department with additional simulation suggestions to use on the day of the simulation. (These suggestions can also provide useful initial planning information when creating the simulation scenario or when sequencing simulation events.) These suggestions are designed to provide base-line "generic" simulation information for the squadron to review and consider both before and after scenario administration.

Simulation Suggestions

1. Have the squadron simulation planning team meet one-hour prior to the assigned starting time. Starting time is defined as one-hour before the scheduled launch time of the preassigned mishap aircraft/aircrew. Briefly review the scenario sequence of events. Resolve any last minute questions. Be discrete, don't inadvertently alert other squadron members about the commencement of the simulation. (An alternative to this process is to establish a block of time for the drill to commence i.e., August 3rd, 4th, or 5th, with no set hours established. This will prompt all participants to be adequately prepared for the exercise while still providing the important element of surprise.)

2. Update, at a minimum, the Squadron Commanding Officer, the Wing Commander, and the Base Commanding Officer on the exact starting time of the simulation.

3. Just before the simulated mishap aircraft taxis for takeoff, the ASO boards the aircraft and briefs the aircrew. (Prior to this briefing, only the Plane Commander/Mission Commander is aware of the simulation. The element of surprise will afford the squadron a more valuable training experience.) The ASO hands out the "cue cards" to each member of the crew and informs them of their respective role(s) in the simulation. If the medical department or crash/rescue requested simulated injuries as part of the scenario, the ASO will brief the simulated injuries at this time. (Medical will usually make-up triage tags for medical personnel to interpret.) The ASO departs the aircraft and the plane commences taxi operations.

4. The Safety Officer contacts the tower, gives the tower the aircraft call sign, number of crewmembers on-board, and informs the tower that the aircraft has commenced taxi operations (The simulation is underway!). The Safety Officer also reviews with the tower supervisor the correct crash phone terminology used when initiating the exercise. ("This is a drill, this is drill, etc.")

5. Simulation instructors assume their respective positions to initiate instruction and evaluation. Simulation evaluation commences after the tower initiates the simulation via the crash phone system (this will be scenario dependent).

SIMULATION EVALUATION

Simulation evaluation is an important phase in the simulation training process. The premishap instruction provided in the "Squadron Premishap Training Program" is designed to bring about the learning of several specific kinds of capabilities, problem solving, rule learning, defining procedures and concepts, information learning, and application skills). The base-wide simulation scenario provides the environment to actually apply these previously learned capabilities and skills under near "operational" conditions. Finally, proper simulation evaluation provides a means to measure the extent and success of the program's learning process.

This portion of the training program is designed to provide the Squadron Safety Department with the information to properly evaluate both the performance of each individual

squadron unit participating in the simulation scenario (AMB, Duty Office, etc.) and to evaluate the effectiveness of the simulation exercise as a whole.

Individual Unit Evaluation

Each squadron unit i.e., the AMB, Emergency Reclamation Team, Squadron Duty Office Watch Team, etc., participating in the mishap simulation needs to be evaluated. As mentioned earlier in the "Format of the Critiques" segment of this section, these evaluations should be designed in a standardized format. In addition, the evaluations should be easy-to-use and easy-to-understand.

The performance based objectives listed in the AMB lesson plans (Appendix A-1) provide most of the criteria to use when formulating the AMB simulation evaluations. These lessons will also provide a good model to use when preparing simulation evaluations for the other squadron units. To help get you started, an example of an AMB evaluation format is provided in Figure 1 below. The evaluation illustration depicted is designed to evaluate the AMB's mishap photographic knowledge/skill using AMB lesson #3, Appendix A-1, as a principal reference. This illustration uses the same evaluation format designed and used in evaluating/assessing the performance of the Duty Office Watch Teams.

AMB Mishap Photography Evaluation

Objectives: Given a defined naval aircraft mishap, be able to determine what physical evidence at the mishap site needs to be photographed in accordance with NAVAIR 00-80T-116-1.

Given mishap photographs containing privileged information, be able to examine and use these photographs in accordance with OPNAVINST 3750.6Q.

Objective #1

Photographer

Was the mishap photographer properly briefed on mishap site-security?

☐ Yes ☐ No

Who briefed the photographer? _____

Was the photographer informed to overshoot and underprint?

☐ Yes ☐ No

Was the photographer assisted/directed by an AMB member throughout the simulation?

☐ Yes ☐ No Comment_____

_____

Photographic Requirements

Did the AMB direct shooting perishable photos first?

☐ Yes ☐ No

Figure 1

Did the photographer photograph the minimum required items listed in AMB lesson #3?

☐ Yes ☐ No

Circle the required items that were photographed.

a. mishap site from ground level
b. impact marks
c. cockpit switches and controls
d. major aircraft components
e. suspect parts
f. surrounding terrain/damage
g. damage to aircraft

Note: the mishap-site photographer will supply the AMB with photo contact sheets showing all pictures taken during the simulation. The AMB can review the comprehensiveness and completeness of the photography effort once given these contact sheets.

Photographic Techniques

Did the AMB photos start from an overall perspective and work to the closeup?

☐ Yes ☐ No Comment_____

_____

Did the AMB use a ruler or other device for size comparison and measurement issues?

☐ Yes ☐ No Comment_____

_____

Did the AMB record the location, subject, and date of each photograph?

☐ Yes ☐ No Comment_____

_____

Figure 1 (cont)

Additional Comments

_____

_____

_____

_____

_____

_____

Overall Rating

Outstanding	Good	Average	Fair	Unsatisfactory
5	4	3	2	1

(circle one)

Objective #2 ...

Figure 1 (cont)

This uncomplicated format will provide the evaluator with a performance-based assessment tool that is both easy-to-formulate and easy-to-administer.

In addition to the student/unit evaluation mentioned above, it is also important to solicit from each instructor and/or evaluator involved in the training program their comments and/or suggestions pertaining to the planning, organizing, administration, and evaluation of the simulation exercise. Specifically request both information describing the strong elements of the simulation as well as the negative or unsatisfactory elements associated with the training exercise. This "lessons learned" information is extremely helpful when planning a follow-on simulation.

Squadron Debrief

Once all the critiques and evaluations are collected and examined, the squadron simulations planning team should formally debrief the Commanding Officer on the outcomes of the exercise. This process should occur as-soon-as all feedback information is thoroughly analyzed, generally within a week following the simulation. All aspects of the training exercise should be discussed, providing the Commanding Officer with the strong and weak training areas exposed during the simulation. Action alternatives to the deficient areas should be proposed and/or initiated prior to this debriefing.

In addition, provide the non-command participants with all assessment materials relating to their performance. Provide these units/departments with a copy of the simulation recap including relevant simulation "lessons learned" information.

Segment Evaluation

The "Squadron Premishap Training Program" developed by this thesis consists of three different segments: AMB Training, Duty Office Watch Team Training, and Base-Wide Premishap Simulation Training. This final portion of the base-wide training segment provides the squadron Safety Department with an evaluation form to use in assessing the

effectiveness of each individual segment of the program mentioned above. This evaluation form, provided in Appendix B-3, should be administered to all "students" i.e., AMB members, duty office watch teams, PAO, etc., after each training session. These evaluation forms will assist the squadron safety department in determining the effectiveness of each area of the training program. If deficiencies are noted by the Safety Department, corrective action to alleviate the deficiencies can occur. This method of training feedback is an extremely important process in maintaining the relevance of the "Squadron Premishap Training Program."

SUPPLEMENTAL PROGRAM MATERIALS

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APPENDIX B-1. SITE SECURITY BRIEFING CHECKLIST

BRIEFING CHECKLIST

1. PROTECT ALL MILITARY AND CIVILIAN PROPERTY AND PERSONNEL.

2. KEEP SPECTATORS AT A SAFE DISTANCE FROM THE MISHAP SITE. A SITE SAFETY PERIMETER NEEDS TO BE/HAS BEEN ESTABLISHED.

3. ADMIT ONLY AUTHORIZED PERSONNEL TO THE CRASH SCENE.

   A. Personnel displaying squadron/wing approved badges.

   B. Personnel listed on mishap site access rosters.

   C. Personnel escorted or approved by AMB Senior Member. The AMB Senior Member is Mr./Ms._____.

   D. Access to the mishap site should be restricted to essential medical, EOD, rescue, and fire fighting personnel until the site is declared safe. The AMB Senior Member will inform sentries of this "safe-site" declaration.

4. PREVENT HANDLING OR DISTURBING OF AIRCRAFT WRECKAGE.

5. TAKE ALL PRECAUTIONS TO PREVENT OBLITERATION OF ANY GROUND MARKS/SCARS MADE BY THE AIRCRAFT UPON IMPACT.

6. REMAIN ON-DUTY UNTIL PROPERLY RELIEVED.

   A. Provide thorough pass-down of important information before discharging duties as sentry.

7. RESPONSIBILITIES CONCERNING NEWS REPORTERS, PHOTOGRAPHERS, AND THE RELEASE OF INFORMATION ARE AS FOLLOWS:

   A. Until the mishap site is declared safe, no media will be allowed within the established safety perimeter. Once the site is declared safe then media will be allowed access to mishap site upon approval of AMB Senior Member.

APPENDIX B-1. SITE SECURITY BRIEFING CHECKLIST (CONT.)

B. Do no use force to restrict access of personnel into site perimeter unless a National Defense Area (NDA) has been declared. The AMB Senior Member will inform sentries of this notice.

C. Abstain from any speculation as to the cause of the mishap. Refer all inquiries to the AMB Senior Member or the Public Affairs Officer. The Public Affairs Officer is Mr./Ms._____.

D. Politely ask civilians and news media personnel not to photograph deceased personnel.

E. Politely ask civilians and news media personnel not to photograph classified equipment or information. If they persist, do not try to stop them, but simply inform them that it is a criminal offense for anyone to photograph, publish, or refuse to surrender classified information to proper military authorities.

8. PREPARE FOR NIGHTTIME OPERATIONS (CLOTHING, GLOVES, ETC.).

9. IN THE EVENT OF PERSONAL INJURY REPORT TO A CORPSMAN/ MEDICAL PERSONNEL **IMMEDIATELY.**

10. FOLLOW ALL OF THESE BRIEFING ITEMS PERSONALLY. DON'T GET BORED IN THE MIDDLE OF THE NIGHT AND DECIDE TO GET CURIOUS.

Source: Technical Manual Safety Investigation Volume I, Mishap Investigation, NAVAIR 00-80T-116-1, May 1987.

APPENDIX B-2. MISHAP SITE DO'S AND DON'TS BRIEFING

INSTRUCTIONAL BRIEF FOR ALL PERSONS INVOLVED IN MISHAP INVESTIGATIONS EFFORT

1. DON'T RELY ON MEMORY--MAKE NOTES AS YOU GO.

2. DON'T INDISCRIMINATELY DRIVE OR TRAMPLE ON THE GROUND NEAR THE SCENE, YOU MAY RUIN VALUABLE GROUND SCARS.

3. DON'T FLIP PARTS ABOUT, SINCE YOU MAY RUIN VALUABLE EVIDENCE. DON'T TOUCH IT, MERELY ENSURE ITS LOCATION IS MARKED FOR STUDY LATER.

4. DON'T RELEASE WRECKAGE UNTIL YOU ARE SURE THAT IT WILL NOT BE NEEDED FOR FURTHER EXAMINATION.

5. DON'T DECIDE THAT YOU ARE ABLE TO ESTABLISH THE CAUSE OF A MISHAP UNTIL YOU ARE SURE YOU HAVE CONSIDERED ALL RELEVANT ASPECTS OF THE AVAILABLE EVIDENCE, AND THAT YOU HAVE ALL THE EVIDENCE THAT IS AVAILABLE.

6. DON'T JUMP TO A CONCLUSION AS TO THE CAUSE OF A MISHAP--VITAL EVIDENCE IS OFTEN LOST THROUGH INVESTIGATORS TRYING TO TAKE SHORT CUTS.

7. DON'T DISMANTLE ANY COMPONENTS OF AIRCRAFT WITHOUT INSCRIBING REASSEMBLY MARKS ON THEM. THIS APPLIES ALSO TO CUTTING SPARS, STRUT WIRES, ETC., THAT YOU MAY NEED TO EXAMINE LATER--ALWAYS MARK THEM FIRST.

8. DON'T DISMANTLE SMALL COMPONENTS ON A DIRTY SURFACE. ALWAYS LAY CLEAN MATERIAL UNDER THEM.

9. DON'T PUT TWO FRACTURED SURFACES TOGETHER SO THAT THEY TOUCH, IF THERE IS ANY LIKELIHOOD OF THEIR HAVING TO BE MICRO-EXAMINED; KEEP SUCH FRACTURES PROTECTED BY WRAPPING.

10. DON'T LET IT BE THOUGHT THAT THE PURPOSE OF A SAFETY INVESTIGATION IS TO APPORTION BLAME; MAKE YOUR STATUS CLEAR.

APPENDIX B-2. MISHAP SITE DO'S AND DON'T BRIEFING (CONT.)

11. DON'T LOOK FOR ONLY ONE CAUSE. MOST MISHAPS ARE DUE TO A NUMBER OF CAUSES. ALL FACTORS SHOULD BE STATED SO THAT THEY MAY BE ANALYZED AND FORM THE BASIS OF ALL SUBSEQUENT ACTION TO PROVIDE REMEDIES.

12. DON'T DISCUSS THE MISHAP WITH PERSONS NOT DIRECTLY RELATED TO THE INVESTIGATION.

13. DO TALK TO WITNESSES AS SOON AS POSSIBLE AFTER THE MISHAP.

14. DO VISIT THE SCENE. GET AS MUCH FIRST-HAND INFORMATION AS YOU CAN POSSIBLE GET. MAKE SKETCHES, TAKE MEASUREMENTS, AND WRITE DOWN ALL INFORMATION.

15. DO REMEMBER THAT THIS IS YOUR FULL-TIME, PRIMARY DUTY UNTIL THE INVESTIGATION IS COMPLETE.

STANDARD POLICIES

1. USE EXTREME COURTESY WHEN TAKING TO THE PUBLIC OR NEWS MEDIA PERSONNEL. EACH INDIVIDUAL'S CONDUCT MUST ENHANCE RATHER THAN DEGRADE COMMUNITY RELATIONS.

2. ABSTAIN FROM ANY SPECULATIONS AS TO THE CAUSE OF THE MISHAP.

3. REFER ALL QUESTIONS FROM THE PUBLIC OR NEWS MEDIA TO THE AMB SENIOR MEMBER OR THE DESIGNATED PAO.

4. POLITELY ASK CIVILIAN AND NEWS MEDIA PERSONNEL NOT TO PHOTOGRAPH DECEASED PERSONNEL.

5. POLITELY ASK CIVILIAN AND NEWS MEDIA PERSONNEL NOT TO PHOTOGRAPH CLASSIFIED EQUIPMENT OR INFORMATION. IF THEY PERSIST, DO NOT TRY TO STOP THEM, BUT SIMPLY INFORM THEM THAT IT IS C CRIMINAL OFFENSE FOR ANYONE TO PHOTOGRAPH, PUBLISH, OR REFUSE TO SURRENDER CLASSIFIED INFORMATION TO PROPER MILITARY AUTHORITIES.

6. RESTRICT ENTRY TO THE CORDONED MISHAP SITE TO AUTHORIZED PERSONNEL ONLY.

Source: Technical Manual Safety Investigation Volume I, Mishap Investigation, NAVAIR 00-80T-116-1, May 1987.

APPENDIX B-3. TRAINING EVALUATION FORM

Course/Lesson_____ Date_____

Instructor(s)_____

1. Was the course/lesson well organized?

☐ Yes ☐ No Comment_____

_____

2. Was time spent effectively during the training?

☐ Yes ☐ No Comment_____

_____

3. Was the instructor adequately prepared for the lesson and/or training?

☐ Yes ☐ No Comment_____

_____

4. Were difficult concepts made understandable?

☐ Yes ☐ No Comment_____

_____

5. Did the instructor invite questions and if so were adequate answers provided?

☐ Yes ☐ No Comment_____

_____

6. Were the objectives of the training made clear?

☐ Yes ☐ No Comment_____

_____

7. Was instruction sufficient to enable you to perform the required practical application(s)?

☐ Yes ☐ No Comment_____

_____

APPENDIX B-3. TRAINING EVALUATION FORM (CONT.)

8. Was there any material, concepts, or subject matter that was difficult to learn during the training; please list and comment why.

☐ Yes ☐ No Comment_____

9. Was the training a worthwhile learning experience?

☐ Yes ☐ No Comment_____

10. Do you have any suggestions to increase the level of instruction and/or training provided by this course/lesson?

☐ Yes ☐ No Comment_____

11. Any additional comments?_____

Thank-you for you time, assistance, and comments!

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